Twenty-Second Biennial Report

State Coal Mine Inspector

1905-1906

ERRATA.

Page 55, change Gorham "shaft" to "slope."
Page 62, change Danville "shaft" to "slope."
Page 63, change Williamsville "shaft" to "slope."
Page 63, change Tudor "shaft" to "slope."
Page 63, change Patterson "shaft" to "slope."
Page 69, change Alpine "drift" to "shaft."
Page 86, change Whitehouse "shaft" to "slope."
Page 138, 17th line from bottom should read "five-foot."
Page 138, 16th line from bottom should read "five-foot."

Twelfth Biennial Report

OF THE

State Coal Mine Inspector

1905-1906

1907
THE SMITH-BROOKS PRINTING CO., STATE PRINTERS
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LETTER OF TRANSMITTAL.

Denver, Colo., December 31, 1906.

HON. JESSE F. McDONALD,
Governor of Colorado.

Dear Sir—In accordance with section 17 of an act entitled "Coal Mines," I beg herewith to submit to you the twelfth biennial report of the Department of Coal Mines, covering a period of two years, beginning with January, 1905, and ending December 31, 1906. In connection with the report, I have made recommendations relative to the changing and amending of the present mining law.

Thanking you for the great interest you have always manifested in the work of this department, I am,

Very respectfully,

JOHN D. JONES,
State Inspector of Coal Mines.

Twelfth Biennial Report

OF THE

State Coal Mine Inspector

1905-1906

INTRODUCTION.

The biennial period just closed is remarkable for its prosperity to both operators and employes in general, and shows a decided and permanent growth of the coal industry in this State. From the total production of 6,776,551 tons in the year 1904 to 8,989,631 tons in 1905 and 10,308,421 tons in 1906, an increase of 32.6 per cent. and nearly 14.7 per cent., respectively, is a phenomenal record of growth, and the indications are that this development will continue for a long time to come. All of the increase of 1905 over 1904 was not due to a steady natural growth, but is partially attributable to a loss of over one million tons caused by the strike in 1904. Notwithstanding this great output, the operators were badly hampered by a car famine during the fall and early winter of both years, and all the product that could have been mined, and for which there was a demand, could not be conveyed to the markets because of a lack of railroad cars. This and a scarcity of miners in the various coal camps kept the record down from what it would have been under more favorable conditions, as above stated. The increase was rather uniform throughout the different coal districts, Las Animas county leading, and Huerfano and Boulder counties following. Only two of the counties fell slightly behind, viz., Delta and Pitkin. There is a constant demand for the Las Animas county product, which is used principally for steam and coking purposes, for which it is especially adapted by its excellent qualities; therefore, the mines are kept busy during the summer as well as the winter seasons; hence the maintenance of its supremacy over other counties.

Colorado leads all the other coal producing states west of Illinois, and in 1905 ranked as the seventh largest producer in the United States. The large demand for our product was a strong incentive for the investing of capital in the developing of many

new mines in the different coal fields, particularly so in Las Animas, Boulder and Weld counties. The equipping of these mines is modern, and up to date appliances are installed. It speaks greatly for the progressive spirit of the day that a number of these new mines had their second openings (escape shafts) made immediately after the main shafts were sunk, and thus avoiding the great danger incident to the postponing of this important work until the minimum of the mining law's requirement of 15,000 square yards has been excavated.

It is gratifying to report that during the two years just passed many improvements were made along lines tending to enhance the safe and sanitary conditions in the mines, and several companies have adopted measures towards the safeguarding of their employes that are beyond the requirements of the law, such as establishing shot-lighters, or the firing of shots by electricity, when the men have withdrawn from the mines.

The practice of using the air courses paralleling the slopes, and other mechanical haulage roads for traveling ways, is becoming popular, and is in vogue at several mines. The use of man ways for employes to pass in and out of the workings does away with the danger of accidents of men coming in contact with moving motors and rope trips. Also the sprinkling of non-gaseous mines is receiving general attention. These improvements are not compulsory, though they should be.

While making our inspections and investigations, we, in nearly all cases, receive the hearty support of the mine officials in placing their mines on a good and healthy basis. Our suggestions and recommendations for improvements have been willingly complied with.

I have heretofore stated that it is entirely beyond the capacity of the present office force to make inspections as frequently as the law requires. But we inspect all the mines as often as possible, however, giving greater time and attention to those which we deem in need of the closest observation and care. During 1906 there were three applications made to the department for special inspections. Such demands receive prompt attention, and in every instance we were successful in effecting a speedy relief and a satisfactory adjustment of the defects complained of.

In 1905 fifty-nine fatal accidents occurred inside of the mines, which, when considering the increased tonnage, shows a slight decrease, being below the average of the fatality records of former years. In 1906 the list of fatalities is exceedingly high. The increase was principally augmented by two gas explosions, one at Maitland, February 19th, killing fourteen men, and the other in the second north Cuatro, April 22nd, resulting in the death of nineteen persons. Outside of these two mine disasters the number of miscellaneous accidents is in proportion to the total output, considerably lower than in 1905. The various fatalities of 1906 are classified as follows: By falls of coal and roof,

45; by gas explosions, 34; by pit-cars, 3; by blasting, 4; electrocuted, 1; falling down shaft, 1. Americans, 12; English, 2; Scotch, 4; Italians, 25; Slavonians, 10; French, 8; Austrians, 7; Hungarians, 4; Finlander, 1; Tyrolese, 2; Mexicans, 5; Swede, 1; Germans, 2; Polanders, 1; Japanese, 3; Colored, 1.

A large proportion of the miners in Colorado are men of very limited experience in coal mining, the majority of them are foreigners taking up coal mining as a livelihood without any previous training, and in consequence are deficient in detecting the dangerous phases as they present themselves from roof and coal at the faces of their workings. Naturally they neglect to do the necessary timbering of the roof and the spragging of the coal, resulting in many accidents which might be avoided by a more experienced miner. Therefore, for the protection of such a class of miners unskilled along these lines, a rule of systematic propping should be enforced upon them, and the spragging of the coal while it is being undermined should be compulsory to all classes. This course no doubt would seem to many old practical miners a useless expenditure of time, but it would be the means of largely decreasing the fatalities. Postponement of timbering or pulling down threatening pieces of roof until a certain amount of work, such as finishing loading a car, etc., has been done, occasionally results disastrously, and, strange to say, more frequently with an old, practical miner than with one less experienced.

Mr. D. J. Griffiths, deputy state coal mine inspector, has faithfully fulfilled the duties assigned to him, and in a most competent manner. His recommendations are always sound and advantageous to both operator and miner, and I take this opportunity to express to him my appreciation of the valuable aid he rendered in co-operating with me in the discharge of the important duties of this department.

Attention is especially called to the map accompanying this report. It is the first authentic and correct map of the kind, and in my opinion, it adds much to the value of the report. Many requests are continually received for such a map, many coming from other states. Information of the exact location of the available coal areas with possibilities of transportation can be more clearly obtained by a brief examination of the map than a written description can convey.

DEFECTS OF THE COLORADO COAL MINING LAW.

The purpose of coal mining laws is the protection of life and health of the employes in and about mines and the preservation of property. Our present law governing coal mines was enacted in 1883. It was amended in 1887, but since then it has not been expanded to cope with the great changes that science and modern inventions have made in this industry. New discoveries have led to different methods of extracting coal, of haulage, etc. Widened experience and scientific observation have disclosed elements of danger not known to exist in mines when

the present statute was framed, and to which the miner is continuously exposed while working. For instance, when these regulations for the safeguarding of life were made, the world was totally unaware of the fact that the coal dust in mines is in itself explosive. The scientists then claimed that coal dust was dangerous only in the presence of explosive gas, and it was on this hypothesis that the law required the sprinkling of gaseous mines only. More than one-half of the explosions which have taken place in our State occurred in what are classed non-gaseous mines. The law does not compel sprinkling in such mines, and while many operators comply with the recommendation of sprinkling, yet it should be made obligatory.

The provisions of the various sections of the present statute are indecisive and conflicting in their restrictions as to the maximum number of men allowed to work in a mine before the same comes under the exercising authority of the law. For instance, section 1 reads: "That the owner or agent of each mine or colliery in this State, employing ten or more men, shall make, etc." Thus placing the said maximum at nine men. Section 13 specifies that "The provisions of this act shall not apply to or effect any coal mine in which not more than ten men are employed, etc." Here the maximum is ten men. Section 11 stipulates that "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." This shows the maximum to be twelve miners, and entirely disregarding the number of day men that may be working in the same mine. Some of the operators of these mines employing ten or less men, under this vague and contradictory reading of the law, occasionally endeavor to evade complying with the law's requirement, and the result is that their employes often suffer from want of a sufficient supply of air. The law should be made so that it will protect the life and health of one man as well as a number. Therefore, to rectify these defects, and at the same time eliminate the afore described complications, all coal mines, regardless of the number of employes, should be subject to all the requirements of the law.

The minimum distance required between main shaft or opening and the air shaft, or second opening, is 100 feet. As far as the natural strata of the formation is concerned, this may be ample in some localities, but it is apparent that the framers did not take into consideration the possibility and danger of fire from the surface buildings of the main shaft, should one occur, and which might easily spread to the fan building. It is possible to have 100 feet between the two shafts and for the surface buildings of the main shaft, such as engine and boiler houses, to reach within close proximity of the fan house at the

air shaft. Under such conditions, if a fire originated of sufficient extent and would start at the tipple, engine or boiler house of the main shaft, it would be next to impossible to save the fan house and would result in the suffocation of all men in the mine.

Two such fires occurred at our mines during this biennial period—one at the Fremont mine, Williamsburg, and the other at the Industrial mine, Superior—both resulting in the complete destruction of the surface buildings and their shaft's timber for some distance down. Fortunately, the air shafts of these two mines are located nearly double the required minimum distance from their main shafts, and yet it was by prompt action and heroic efforts of the men on top, and favored by the direction of the wind, that the fires were not carried to the air shafts. By such a close margin the men below were saved. The minimum distance should be at least 250 feet between the fan and main shaft buildings or any other buildings of inflammable nature.

Section 17 of the mining law specifies that all mines coming under this act shall be examined at least once every three months. In 1886 the total production of the State was 1,436,211 tons, and 38 mines were in operation. In 1887, on the basis of these figures, the Sixth General Assembly passed an amendment authorizing the inspector to appoint a deputy, thus providing two men to do the work, and the force has remained the same up to the present time. In 1906 Las Animas county alone produced 4,854,606 tons, or over three times the State's entire production in 1886, and since which date the total tonnage of the State has increased over 600 per cent., with 180 mines scattered over a wide territory and some with miles of underground workings. Besides, we may expect from present indications that Routt county will commence developments on its extensive coal fields, increasing the tonnage by many hundred thousands before the Legislature meets again in 1909. With new mines opening up and greater depths reached in the old workings, requiring more time to inspect, it will be clearly seen that to inspect these mines thoroughly and systematically and as often as the statute requires, the office force should be increased to at least four men by adding two more deputies. Better results would be obtained for the benefit of the miners and the preservation of property. There are numerous other improvements not here mentioned, but which are given in the list of recommendations, that have an equally important bearing on the welfare of the industry and which should be considered. The growth and extent that coal mining has attained, as shown by the above figures, has brought about conditions that the old, antiquated law can no longer meet. Therefore, it is the most urgent duty of the incoming Legislature to take this law under serious consideration. Each defective section should be remodeled and be so amended that it will act in conformity with modern require-

ments and that all conditions may be dealt with to effectively reduce fatalities and injuries and guard against a needless waste and destruction of property.

RECOMMENDATIONS.

(1) The force of the inspecting department should be increased by two more additional deputy inspectors, so that the mines may be inspected as often as the statute requires.

(2) All mines, regardless of the number employed underground, should be within the jurisdiction of the mining law.

(3) Non-gaseous as well as gaseous mines that are dusty should be thoroughly sprinkled.

(4) Distance between the mine fan house and the nearest inflammable building should be not less than 250 feet.

(5) To avoid the danger from water or gas breaking in from one mine into another, all operators should be required by law to leave barrier-pillars between their own and adjoining properties. Such pillars to be of sufficient thickness to effectively resist the greatest water pressure that could be generated by the inundation of an adjacent mine.

(6) To evade the danger to the lives of employes from catastrophes incidental to a single opening, the second opening should be made at the same time or immediately after the first opening is ready for operation. The present statute allows the excavation of 15,000 square yards before a second opening is required.

(7) The law should provide that owner or owners of a new mine shall report the same not later than fifteen days after the work of opening commences, giving the name and address of the company and location and character of the opening.

(8) Restrictions should be placed on the amount of powder or high explosive to be taken into the mine at any one time, and none should be stored in the mine.

(9) The statute should forbid the using of any oil for illuminating purposes underground other than those oils which are intended for such use.

(10) Occasional trouble is experienced at some mines during severe cold weather from accumulations of ice in the air shafts. Masses of ice thus formed sometimes fall through the shaft and tear away portions of the ladder-escape way. The ladderway should be separated from the other part of the air shaft by a continuous partition of sufficient strength from top to bottom.

SUMMARY OF THE COAL PRODUCTION OF COLORADO FOR 1905 AND 1906.

	1905	1906
Number of mines in operation	175	180
Tons of litnite coal produced	1,371,057	1,670,044
Tons of semi-bituminous coal produced	735,010	911,265
Tons of bituminous coal produced	6,689,897	7,548,769
Tons of anthracite coal produced	63,667	68,343
Tons of unclassified coal produced. estimated	130,000	110,000
Total tonnage of coal produced	8,989,631	10,308,421
Tons of coal mined by hand	.....	8,945,137
Tons of coal mined by machines	.....	1,363,284
Total number of mining machines used	.....	128
Total tons of coke manufactured	1,151,837	1,133,643
Total number of coke ovens	2,376	3,376
Number of employes in and about mines	11,891	12,030
Number of employes at the coke ovens	1,278	1,076
Number of non-fatal accidents	100	160
Number of fatal accidents	59	88
Tons of coal mined for each life lost	152,367	117,141
Tons of coal mined for each non-fatal accident	89,896	64,428
Number of employes for each life lost	202	137
Number of employes for each non-fatal accident	119	75

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Simpson	Mitchell	Gladstone
Thickness of vein	14 ft.	12 ft.	12 ft.
Kind of opening	Shaft	Shaft	Shaft
Character of coal	Lignite	Lignite	Lignite
January	8,749	3,688	1,259
February	9,046	2,359	2,095
March	12,728	2,693	1,475
April	12,489	1,491	1,494
May	11,984	1,931	1,878
June	10,532	2,102	1,636
July	11,176	1,423	1,386
August	13,961	2,308	2,660
September	11,669	3,798	1,788
October	27,879	6,553	2,022
November	31,453	6,490	1,641
December	30,350	6,893	1,678
Totals	192,016	41,729	21,012

BOULDER COUNTY, 1905.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Hecla	Rex No. 1	Rex No. 2	Gorham	Industrial	Acme
8 ft.	6 to 8 ft.	8 ft.	7 to 12 ft.	7 ft.	8 ft.
Shaft	Shaft	Shaft	Shaft	Shaft	Shaft
Lignite	Lignite	Lignite	Lignite	Lignite	Lignite
4,506	3,032	7,737	4,151	5,388	7,987
3,687	8,439	8,192	3,847	6,391	6,737
2,521	7,651	6,031	2,329	3,286	5,222
2,231	4,516	6,222	2,234	3,650	4,222
1,394	2,381	3,348	1,955	3,107	2,986
1,200	1,307	2,095	1,018	2,591	3,282
1,105	1,702	2,872	.....	2,455	3,638
1,585	2,806	3,747	.....	2,074	3,720
1,645	4,146	5,861	.....	3,820	3,943
4,335	10,259	9,381	1,066	6,727	9,120
6,507	11,261	10,030	3,045	7,709	10,013
5,000	12,000	11,000	4,575	9,827	11,000
35,716	69,500	76,516	24,220	57,025	71,875

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Monarch	Haywood	Strathmore
Thickness of vein	7 ft.	6½ to 12 ft.	11 to 12 ft.
Kind of opening	Shaft	Shaft	Shaft
Character of coal	Lignite	Lignite	Lignite
January	8,960	2,771	6,280
February	8,038	2,738	4,783
March	8,177	2,447	6,499
April	8,350	1,960	1,335
May	6,638	1,627	2,273
June	5,155	1,288	2,242
July	5,818	1,230	2,320
August	6,564	1,654	2,279
September	9,469	1,733	3,087
October	10,256	1,790	3,036
November	12,775	1,853	4,924
December	12,598	2,000	6,500
Totals	102,798	23,091	45,558

BOULDER COUNTY, 1905.—Continued.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Matchless	Fox	Sunnyside	Standard	Black Diamond	Shannahan
5 ft.	8½ ft.	5 ft.	8½ ft.	11 ft.	11 ft.
Shaft	Shaft	Shaft	Shaft	Slope	Slope
Lignite	Lignite	Lignite	Lignite	Lignite	Lignite
4,151	2,206	.....	150	1,350	455
4,361	1,979	.....	922	1,275	475
3,125	1,392	.....	921	1,275	375
4,506	1,258	.....	1,181	1,100	400
1,955	1,017	.....	.....	900	250
1,873	1,283	.....	.....	550	200
1,586	1,297	.....	.....	600	200
2,520	1,239	1,827	.....	600	200
3,008	1,901	1,177	.....	800	300
4,152	3,044	1,725	60	800	400
5,000	4,109	1,070	150	950	425
5,500	5,400	1,692	2,000	1,000	400
41,737	26,125	7,491	5,384	11,200	4,080

PRODUCTION OF BOULDER COUNTY, 1905.—Concluded.

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

Name of mine	Rosser No. 7	Blue Ribbon	Crescent	New Baker	
Thickness of vein	7 ft.	12 ft.		5 ft.	
Kind of opening	Drift	Slope	Shaft	Slope	
Character of coal	Lignite	Lignite	Lignite	Lignite	Total Tonnage
January	65	590	800	347	74,472
February	73	525	765	420	76,375
March	115	526	135	190	69,114
April	99	278	210	250	59,216
May	105	341	210	284	47,745
June	244	338	90	179	39,205
July	276	393	150	149	39,776
August	790	711	214	215	51,674
September	390	665	319	215	59,734
October	389	592	443	186	104,215
November	360	823	655	116	121,364
December	350	623	1,120	200	131,706
Totals	3,256	6,405	5,111	2,751	874,596

PRODUCTION OF DELTA COUNTY, 1905.

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

Name of mine	Juniata	
Thickness of vein	4½ and 14 ft.	
Kind of opening	Drift	
Character of coal		Total Tonnage
January	825	825
February	287	287
March	560	560
April	470	470
May	351	351
June	439	439
July	950	950
August	1,540	1,540
September	830	830
October	1,010	1,010
November	880	880
December	925	925
Totals	9,067	9,067

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Curtis	Rapson No. 2	Danville	Pikeview	Austin Bluffs
Thickness of vein	17 ft.	7 to 9 ft.	10 ft.	12 ft.	7 ft.
Kind of opening	Shaft	Shaft	Slope	Shaft	Shaft
Character of coal	Lignite	Lignite	Lignite	Lignite	Lignite
January	7,315	1,465	6,311	4,681	2,130
February	7,195	1,803	5,830	4,314	2,618
March	5,036	118	5,021	2,944	1,907
April	4,322	169	3,814	2,794	1,063
May	3,743	159	3,315	2,566	816
June	1,682	375	2,489	2,300	665
July	1,858	307	2,162	2,200	535
August	1,636	375	2,804	2,319	439
September	3,169	720	3,905	3,442	614
October	4,608	2,236	4,878	3,191	440
November	4,920	3,538	5,225	2,248	309
December	6,000	5,500	6,943	3,854	500
Totals	51,484	16,765	52,697	36,853	12,036

EL PASO COUNTY, 1905.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Williamsville	Tudor	Franceville	Enterprise	Patterson	
10 ft.	5 ft.	6 ft.	2½ to 3½ ft.	16 ft.	
Slope	Slope	Slope	Shaft	Slope	Total
Lignite	Lignite	Lignite	Lignite	Lignite	Tonnage
1,802	1,500	180	.....	600	25,984
1,512	1,200	148	.....	600	25,220
1,149	1,000	120	.....	700	17,995
707	328	60	.....	450	13,707
467	190	60	.....	500	11,816
355	100	42	.....	500	8,508
175	100	38	.....	500	7,875
276	150	39	.....	500	8,538
585	365	74	.....	772	13,646
1,292	548	120	.....	1,100	18,413
1,061	570	200	.....	750	18,821
1,376	550	250	5,798	800	31,571
10,757	6,601	1,331	5,798	7,772	202,094

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Brookside	Rockvale	Coal Creek
Thickness of vein	5½ to 6 in.	3 to 4 ft.	3½ to 4½ ft.
Kind of opening	Slope	Shaft	Slope
Character of coal	Semi-Bit.	Semi-Bit.	Semi-Bit.
January	4,566	13,705	7,156
February	4,627	16,105	8,082
March	3,895	3,593	4,051
April	3,854	6,294	4,987
May	5,132	14,544	8,001
June	2,134	16,270	6,897
July	3,087	16,368	2,536
August	5,833	9,635	4,460
September	3,904	9,792	4,440
October	5,743	11,509	7,418
November	5,277	15,224	8,299
December	4,742	15,830	8,797
Totals	52,794	148,869	75,124

FREMONT COUNTY, 1905.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Fremont	Nonac	Chandler	Radiant	Magnet	Beacon
3, 3½ and 5 ft.	6 ft.	4 ft. 2 in.	3 ft. 1 in.	4½ ft.	3 to 5 ft.
Shaft	Slope	Shaft	Slope	Slope	Shaft
Semi-Bit	Semi-Bit.	Semi-Bit.	Semi-Bit.	Semi-Bit.	Semi-Bit.
8,227	8,975	4,861	1,001	2,766	.....
9,160	4,042	5,511	4,158	2,715	.....
3,085	3,905	2,814	46	2,146	120
4,057	649	2,293	27	801	1,800
6,761	2,006	3,796	264	2,175	1,780
7,089	2,834	3,426	2,222	3,453	2,005
7,689	3,823	4,439	2,115	4,713	450
5,649	886	6,268	2,848	5,467	.....
4,237	626	4,558	2,552	4,489	.....
952	3,253	2,743	1,428	4,097	425
450	4,424	6,710	1,589	3,579	500
5,775	5,433	7,889	1,550	3,275	568
62,531	40,856	55,308	19,800	39,676	7,648

PRODUCTION OF FREMONT COUNTY, 1905.—Concluded.

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

Name of mine	Bluff Springs	Royal Gorge	Peanut	Williamsburg Slope	Florence	Horseshoe	Cowan	Walsh	
Thickness of vein	4 ft.	4½ ft.	4 ft. 3 in.	4 ft. 3 in.	3 ft. 2 in.	5 ft.	5 ft.	4 ft.	
Kind of opening	Slope	Slope	Shaft	Slope	Drift	Slope	Drift	Slope	Total
Character of coal	Semi-Bit.	Semi-Bit.	Semi-Bit.	Semi-Bit.	Semi-Bit.	Semi-Bit.	Semi-Bit.	Semi-Bit.	Tonnage
January	1,100	1,750	690	1,000	.....	.....	.....	.....	55,797
February	1,100	1,751	400	624	.....	.....	.....	.....	58,395
March	1,100	1,280	230	120	.....	.....	.....	.....	26,265
April	150	1,005	176	100	.....	.....	.....	.....	26,193
May	297	1,127	140	100	.....	.....	.....	.....	46,123
June	529	967	240	154	.....	.....	.....	.....	48,220
July	941	991	168	75	.....	.....	.....	.....	46,795
August	1,242	1,707	288	165	.....	.....	.....	.....	44,448
September	1,048	1,710	252	315	.....	.....	.....	.....	37,923
October	1,402	2,645	459	840	.....	.....	.....	.....	42,914
November	1,474	2,645	486	840	.....	.....	.....	.....	51,497
December	1,500	4,512	720	710	1,044	6,442	1,738	1,225	71,750
Totals	11,883	22,090	4,249	5,043	1,044	6,442	1,738	1,225	556,320

PRODUCTION OF GARFIELD COUNTY, 1905.

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

Name of mine.....	Coryell	Midland	Pocahontas	South Canon	Keystone	
Thickness of vein	13 ft.	6 to 7 ft.	8½, 9½ & 16 ft.	3 and 20 ft.	2½ ft.	
Kind of opening...	Drift	Drift	Drift	Drift	Slope	
Character of coal...	Bitum.	Bitum.	Bitum.	Bitum.	Semi-Bitum.	Total Tonnage
January	2,639	5,962	2,900	.....	.....	11,501
February	2,586	4,996	3,300	.....	.....	10,882
March	1,450	6,768	2,796	.....	.....	11,014
April	296	6,197	1,909	.....	.....	8,402
May	3,060	5,687	1,659	.....	.....	10,406
June	3,202	5,290	1,000	1,889	.....	11,381
July	2,470	5,394	.....	2,567	.....	10,431
August	2,497	6,879	.....	982	.....	10,358
September	3,340	6,368	.....	2,194	.....	11,902
October	2,968	6,322	.....	3,217	.....	12,507
November	2,711	5,508	1,393	4,047	.....	13,659
December	2,808	5,712	3,292	6,052	3,900	21,764
Totals	30,027	71,083	18,249	20,948	3,900	144,207

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Crested Butte	Anthracite	Floresta
Thickness of vein	5 to 12 ft.	4 ft.	1½ and 3½ ft.
Kind of opening	Slope	Drift	Drift
Character of coal	Bituminous	Anthracite	Anthracite
January	14,041	2,383	2,927
February	11,477	1,777	.....
March	14,451	3,012	.....
April	13,352	2,174	.....
May	16,894	1,322	.....
June	15,064	1,767	.....
July	14,521	2,025	2,747
August	16,744	2,595	6,475
September	15,332	1,941	4,197
October	14,068	1,564	4,909
November	18,255	2,062	7,431
December	15,304	2,339	1,460
Totals	179,503	24,961	30,146

GUNNISON COUNTY, 1905.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Alpine	Somerset	Silver Brook	Porter	
7 ft.	12 ft.	3 ft.	12 ft.	
Drift	Slope	Drift	Drift	
Semi-Bituminous	Bituminous	Anthracite	Bituminous	Total Tonnage
.....	14,974	610	1,350	36,285
.....	12,553	100	575	26,482
498	13,038	100	775	31,874
5,139	13,602	100	450	34,817
7,020	14,409	700	1,000	41,345
7,911	9,522	1,000	1,060	36,324
8,740	11,904	900	850	41,687
9,672	11,693	950	1,050	49,179
9,318	16,572	900	675	48,935
9,914	13,513	1,000	1,000	45,968
11,602	17,085	1,100	1,400	58,935
11,884	17,371	1,100	1,400	50,858
81,698	166,236	8,560	11,585	502,689

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Pictou	Robinson	Walsen	Rouse
Thickness of vein	9 ft.	5, 6 and 7 ft.	5, 6, 7 and 8 ft.	5½ ft.
Kind of opening	Slope	Slope	Slope	Slope
Character of coal	Bituminous	Bituminous	Bituminous	Bituminous
January	10,734	14,087	14,843	18,253
February	10,646	14,371	16,587	19,924
March	5,437	3,471	16,927	20,393
April	6,232	3,943	12,502	15,597
May	1,508	11,287	16,504	21,881
June	13,697	15,023	7,003	17,618
July	16,323	16,709	5,144	19,341
August	13,851	11,992	11,137	20,628
September	13,895	11,462	9,230	21,032
October	14,305	14,727	14,336	21,410
November	14,281	13,861	14,831	21,413
December	18,491	14,646	13,261	19,100
Totals	139,400	145,579	152,305	236,590

HUERFANO COUNTY, 1905.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Hezron	Maitland	Pryor	Champion	Toltec	Midway
4 ft.	4 ft. 8 in.	4, 5 and 6½ ft.	5 and 6 ft.	4½ to 6 ft.	6 ft.
Slope and Drift	Slope	Slope	Slope	Slope	Slope
Bituminous	Bituminous	Bituminous	Bituminous	Bituminous	Bituminous
6,878	7,615	5,393	2,854	5,291	10,311
5,659	9,846	4,400	3,003	5,852	8,878
5,924	2,399	2,700	1,674	3,980	9,797
5,968	1,220	2,117	361	4,526	7,499
6,680	6,000	5,861	862	4,526	11,124
5,635	10,908	2,602	1,700	4,924	8,724
5,612	11,264	5,248	1,800	4,512	8,626
6,041	10,491	7,556	1,290	4,554	9,533
6,200	7,278	7,820	474	3,329	9,097
6,687	8,373	6,985	1,330	5,008	9,066
6,291	8,371	8,755	1,849	5,100	9,085
6,001	11,476	8,920	2,349	7,104	9,555
73,576	95,241	68,357	19,546	58,706	111,295

PRODUCTION OF HUERFANO COUNTY, 1905.—Concluded.

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

Name of mine.....	Rugby	Sweet	Sunnyside	Pinon No. 1	Pinon No. 2	Occi-dental	Huerfano	Black Canon	Korte	
Thickness of vein.....	3½ to 4½ ft.	4½ to 6 ft.	6½ to 8 ft.	4½ ft.					2 ft. 10 in.	
Kind of openirg.....	Slope	Slope	Slope	Slope	Slope	Slope	Shaft	Slope		Total
Character of coal.....	Bitum.	Bitum.	Bitum.	Bitum.	Bitum.	Bitum.	Bitum.	Bitum.	Bitum.	Tonnage
January	8,848	3,171	1,530	2,685	....	1,122	1,185	....	....	114,800
February	8,053	3,604	4,079	1,359	. ..	765	1,462	....	....	118,488
March	5,152	640	1,839	2,211	....	1,827	1,018	....	....	85,389
April	3,238	165	1,631	1,298	....	490	....	....	....	66,787
May	6,023	608	3,098	2,548	....	1,680	1,079	....	....	101,269
June	6,489	1,104	2,642	3,081	....	2,041	1,208	....	....	104,399
July	7,964	3,032	4,877	3,027	....	2,306	1,452	....	....	117,237
August	6,547	1,252	2,096	3,495	....	2,083	2,163	....	....	114,709
September	5,724	1,240	3,692	3,022	....	2,174	1,706	....	....	107,375
October	6,777	1,554	3,564	4,650	....	2,758	1,830	....	....	123,360
November	6,349	2,658	6,131	4,864	...	2,650	730	....	....	127,219
December	7,060	4,000	7,380	5,458	17,723	3,000	2,040	3,200	20,300	181,064
Totals	78,224	23,028	42,559	37,698	17,723	22,896	15,873	3,200	20,300	1,362,096

PRODUCTION OF JEFFERSON COUNTY, 1905.

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

Name of mine	Leyden	Cross	
Thickness of vein	9 ft.	3 ft.	
Kind of opening	Shaft	Shaft	Total
Character of coal	Lignite	Lignite	Tonnage
January	19,836	313	20,149
February	17,318	205	17,523
March	14,964	224	15,188
April	13,389	148	13,537
May	13,165	...	13,165
June	11,756	...	11,756
July	11,301	...	11,301
August	12,859	...	12,859
September	14,325	...	14,325
October	20,103	...	20,103
November	18,907	...	18,907
December	21,312	...	21,312
Totals	189,235	890	190,125

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Primtro	Starkville	Sopris
Thickness of vein	7 & 9 ft.	1½ to 7 ft.	3½ to 4½ ft.
Kind of opening	Drift	Drift	Drift
Character of coal	Bituminous	Bituminous	Bituminous
January	37,241	25,739	17,281
February	39,266	23,771	16,084
March	48,639	28,367	17,455
April	44,599	25,298	15,328
May	47,956	24,664	18,340
June	48,152	27,556	17,038
July	44,885	27,046	17,965
August	45,107	27,983	19,938
September	47,434	26,502	18,013
October	50,358	27,427	18,659
November	49,331	25,921	18,560
December	45,800	25,632	16,239
Totals	548,768	315,906	210,909

LAS ANIMAS COUNTY, 1905.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Engle Drift 6 ft. Bituminous	Berwind Drift 6 ft. Bituminous	Tobasco Slope 4 ft. Bituminous	Tercio Drift 3 to 6 ft. Bituminous	Cuatro Drift 5 ft. Bituminous	Hastings No. 1 Slope and Drift 6 ft. Bituminous
28,956	34,211	7,947	13,422	8,526	5,280
26,265	35,645	8,868	13,929	8,116	4,454
30,847	36,307	9,636	20,392	9,189	3,934
26,028	32,565	9,523	18,771	7,666	2,513
30,331	35,368	10,448	20,804	9,351	4,765
28,776	33,498	8,477	20,218	9,356	4,603
27,771	34,954	8,215	21,075	9,108	4,389
28,041	32,441	8,943	23,187	9,499	.....
27,452	36,579	7,943	21,405	9,327	.....
26,873	37,330	9,089	22,175	10,220	.....
28,126	39,032	9,619	24,320	10,742	.....
28,264	40,497	8,864	25,088	9,263	.....
337,730	428,427	107,572	244,786	110,363	29,938

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Hastings No. 2	Delagua	Gray Creek
Thickness of vein	6 ft.	6 ft.	5½ ft.
Kind of opening	Slope and drift	Drift	Drift
Character of coal	Bituminous	Bituminous	Bituminous
January	28,782	30,848	24,422
February	26,093	32,302	21,161
March	17,351	42,203	22,793
April	16,222	31,181	20,129
May	32,350	35,254	24,263
June	26,750	35,975	19,681
July	24,496	42,812	20,926
August	31,912	47,241	23,735
September	30,576	40,782	23,777
October	28,545	33,489	24,530
November	31,063	51,695	21,291
December	37,979	53,917	26,710
Totals	332,119	477,699	273,418

LAS ANIMAS COUNTY, 1905—Continued.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Bowen	Majestic	Bloom	Brodhead	La Belle	Francisca
9 ft.	4½ to 8 ft.	7 ft.	4½ ft.	5 ft.	
Drift	Drift	Drift	Slope	Drift	Slope
Bituminous	Bituminous	Bituminous	Bituminous	Bituminous	Bituminous
12,004	14,000	2,901	7,067	3,150	662
11,970	13,650	3,149	6,988	2,638	742
13,500	15,309	1,733	4,655	3,778	652
10,300	13,277	1,607	3,560	4,260	546
11,515	15,200	1,677	4,520	4,737	788
13,000	14,524	1,105	4,044	4,237	721
12,100	13,166	1,204	5,850	3,703	708
14,300	14,866	1,289	7,390	3,433	822
11,500	14,348	1,341	4,380	3,353	619
12,650	13,534	2,173	4,980	3,239	664
14,220	14,002	2,850	7,850	3,566	590
15,288	13,488	3,000	8,220	3,448	970
152,347	169,364	24,029	69,504	43,542	8,484

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUC

Name of mine.....	Piedmont	Primrose	Gree Canon	Black Diamond
Thickness of vein.....	4½ to 6 ft.	4 ft.	3 ft. 2 in. to 4½ ft.	3½ to 4 ft.
Kind of opening.....	Slope	Slope	Drift	Slope
Character of coal.....	Bituminous	Bituminous	Bituminous	Bituminous
January	200	5,142	4,667	3,993
February	926	6,622	3,393	3,026
March	557	4,176	3,727	360
April	326	5,374	1,707	Idle
May	2,930	8,262	4,534	1,539
June	3,360	7,337	4,436	419
July	3,207	6,619	3,997	1,799
August	3,565	5,845	4,558	1,988
September	3,790	5,406	4,415	3,013
October	3,311	7,043	5,862	3,052
November	2,900	7,381	5,853	3,588
December	5,460	8,033	5,033	3,670
Totals	30,472	77,240	52,182	26,447

LAS ANIMAS COUNTY, 1905—Continued.

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

Greenville	Ludlow	Forbes No. 5	Suffield	Jewel	Southwestern
4½ to 6 ft. 7 in.	5½ to 7 ft.	5 to 7 ft.	7 ft.	4 ft.	4½ ft.
Drift	Drift	Drift	Drift	Drift	Slope
Bituminous	Bituminous	Bituminous	Bituminous	Bituminous	Bituminous
4,655	3,092	10,815	764	1,124	1,244
2,242	2,721	8,322	1,319	752	....
6,780	1,454	10,700	3,160	722	....
2,145	498	6,776	1,150	757	....
6,546	3,081	1,419	3,928	1,190	....
1,382	1,046	13,182	2,325	1,385	....
5,418	3,693	11,773	2,351	1,012	....
5,012	3,963	14,033	948	1,031	....
3,703	4,500	12,994	....	1,043	750
3,736	4,878	12,599	....	240	1,561
6,935	5,502	13,677	848	1,000	1,526
8,223	5,799	17,002	5,330	1,000	1,500
56,777	40,227	133,292	22,123	11,256	6,581

PRODUCTION OF LAS ANIMAS COUNTY, 1905—Concluded.

Name of mine	Valley	Stevens	Big Baldy	Sunlight	
Thickness of vein	5½ ft.	5½ ft.		4 ft. 8 in.	
Kind of opening	Shaft	Shaft	Drift	Drift	Total
Character of coal	Bituminous	Bituminous	Bituminous	Bituminous	Tonnage
January	4,400	367	250	....	343,152
February	5,760	514	285	....	330,973
March	4,442	312	295	....	363,425
April	4,500	248	240	....	307,094
May	2,300	479	230	....	368,769
June	1,672	195	300	....	354,690
July	400	225	200	....	361,067
August	420	386	200	....	382,076
September	425	545	250	....	366,165
October	420	609	250	....	369,487
November	400	728	250	....	403,366
December	1,990	700	300	2,100	428,807
Totals	27,129	5,299	3,050	2,100	4,379,071

PRODUCTION OF LA PLATA COUNTY, 1905.

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

Name of mine	Porter	Hesperus	Ute	City	Champion	Perin's Peak	
Thickness of vein	3 ft.	6 ft.	5 to 6 ft.	2½ ft.	3 ft. 8 in.	7 ft.	
Kind of opening	Drift	Drift	Drift	Drift	Drift	Drift	
Character of coal	Bituminous	Semi-Bituminous	Bituminous	Bituminous	Bituminous	Bituminous	Total Tonnage
January	5,949	5,205	833	1,955	1,110	.....	15,052
February	5,509	3,571	232	1,464	815	.....	11,591
March	5,133	4,155	545	1,462	499	.....	11,794
April	4,101	3,182	661	1,630	587	.....	10,161
May	3,559	4,308	490	1,658	564	.....	10,579
June	4,164	2,545	305	1,507	625	.....	9,146
July	4,441	3,611	83	1,286	1,277	.....	10,698
August	4,535	4,077	141	1,494	1,495	.....	11,742
September	4,295	4,018	160	1,810	978	.....	11,261
October	5,964	5,867	1,047	2,188	880	.....	15,946
November	5,740	5,473	472	3,285	1,070	.....	16,040
December	6,157	6,975	392	2,249	1,450	2,500	19,723
Totals	59,547	52,987	5,361	21,988	11,350	2,500	153,733

PRODUCTION OF MESA COUNTY, 1905.

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

Name of mine	Book Cliff	Cameo	Stokes	Palisade	Riverside	
Thickness of vein	7 ft.	5 ft.	3½ ft.	4 ft.	2 ft. 10 in.	
Kind of opening	Drift	Drift	Drift	Drift	Drift	
Character of coal	Semi-Bitum.	Semi-Bitum.	Semi-Bitum.	Semi-Bitum.	Semi-Bitum.	Total Ton'ge
January	381	1,523	530	1,953	...	4,387
February	115	1,306	460	1,584	...	3,465
March	71	755	355	1,224	...	2,405
April	332	409	141	1,052	...	1,934
May	233	852	60	1,164	...	2,309
June	447	981	105	1,027	...	2,560
July	489	1,006	120	746	...	2,361
August	548	1,134	140	989	...	2,811
September	254	1,375	293	810	...	2,732
October	576	2,130	293	1,145	...	4,144
November	1,360	2,075	303	1,485	...	5,223
December	1,000	2,525	475	1,200	574	5,774
Totals	5,806	16,071	3,275	14,379	574	40,105

PRODUCTION OF MONTEZUMA COUNTY, 1905.

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

Name of mine	Mancos	
Thickness of vein	2½ ft.	
Kind of opening	Drift	
Character of coal	Lignite	Total Tonnage
December	395	395
Totals	395	395

PRODUCTION OF PITKIN COUNTY, 1905.

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

Name of mine	Spring Gulch	Coal Basin	
Thickness of vein	5 to 9 ft.	8 ft.	
Kind of opening	Slope	Slope	
Character of coal	Bituminous	Bituminous	Total Tonnage
January	20,000	15,252	35,252
February	15,000	10,661	25,661
March	17,020	11,146	28,166
April	17,000	10,120	27,120
May	20,470	10,297	30,767
June	18,593	5,839	24,432
July	14,642	8,022	22,664
August	18,430	8,696	27,126
September	17,760	10,306	28,066
October	16,930	11,868	28,798
November	20,832	11,688	32,520
December	18,302	12,412	30,714
Totals	214,979	126,307	341,286

PRODUCTION OF WELD COUNTY, 1905.

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

Name of mine.....	Garfield	Lehigh	Whitehouse	Reliance	Eureka	Shamrock	Columbine	Lister	Washington	Davies	Gem	
Thickness of vein..	5 ft. 10 in.	5½ to 6 ft.	5 to 6 ft.	5 ft.	5½ to 6 ft.	11 ft.	3 ft. 3 in.	4 ft.	5 ft.	5 ft.	4 ft. 4 in.	
Kind of opening....	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Total
Character of coal...	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Tonnage
January	3,607	2,434	756	1,717	685	224	138	425	....	....	....	9,986
February	3,240	2,616	718	1,606	640	194	400	475	....	....	....	9,889
March	1,185	1,948	346	1,280	308	195	490	350	....	....	....	6,102
April	1,407	1,987	196	1,408	76	170	380	280	....	....	....	5,904
May	....	2,394	242	733	177	237	330	325	....	....	....	4,438
June	....	2,310	166	593	394	152	370	350	....	....	....	4,335
July	....	1,985	333	920	237	260	270	300	....	....	....	4,305
August	....	2,264	417	712	475	521	230	400	....	....	....	5,019
September	....	2,658	460	1,037	409	750	580	500	....	....	....	6,394
October	....	5,373	534	1,674	500	793	105	700	....	....	....	9,679
November	....	6,914	679	2,157	547	800	105	1,000	....	....	....	12,202
December	....	6,894	1,034	1,861	1,140	979	100	1,227	7,074	5,000	285	25,594
Totals	9,439	39,777	5,881	15,698	5,588	5,275	3,498	6,332	7,074	5,000	285	103,847

PRODUCTION OF THE STATE OF COLORADO, 1905.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY. ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

	Boulder	Delta	El Paso	Fremont
January	74,472	825	25,984	55,797
February	76,375	287	25,220	58,395
March	69,114	560	17,995	26,265
April	59,216	470	13,707	26,193
May	47,745	351	11,816	46,123
June	39,205	439	8,508	48,220
July	39,776	950	7,875	46,795
August	51,674	1,540	8,538	44,448
September	59,734	830	13,646	37,923
October	104,215	1,010	18,413	42,914
November	121,364	880	18,821	51,497
December	131,706	925	31,571	71,750
Totals	874,596	9,067	202,094	556,320

PRODUCTION OF THE STATE OF COLORADO, 1905. —Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY. ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

	Garfield	Gunnison	Huerfano	Jefferson
January	11,501	36,285	114,800	20,149
February	10,882	26,482	118,488	17,523
March	11,014	31,874	85,389	15,188
April	8,402	34,817	66,787	13,537
May	10,406	41,345	101,269	13,165
June	11,381	36,324	104,399	11,756
July	10,431	41,685	117,237	11,301
August	10,358	49,179	114,709	12,859
September	11,902	48,935	107,375	14,325
October	12,507	45,968	123,360	20,103
November	13,659	58,935	127,219	18,907
December	21,764	50,858	181,064	21,312
Totals	144,207	502,689	1,362,096	190,125

PRODUCTION OF THE STATE OF COLORADO, 1905. —Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY. ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

	Las Animas	La Plata	Mesa	Montezuma
January	343,152	15,052	4,387	.....
February	330,973	11,591	3,465	.....
March	363,425	11,794	2,405	.....
April	307,094	10,161	1,934	.....
May	368,769	10,579	2,309	.....
June	354,690	9,146	2,560	.....
July	361,067	10,698	2,361	.....
August	382,076	11,742	2,811	.....
September	366,165	11,261	2,732	.....
October	369,487	15,946	4,144	.....
November	403,366	16,040	5,223	.....
December	428,807	19,723	5,774	395
Totals	4,379,071	153,733	40,105	395

PRODUCTION OF THE STATE OF COLORADO, 1905. —Concluded.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY. ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

	Pitkin	Weld	Total Tonnage
January	35,252	9,986	747,642
February	25,661	9,889	715,231
March	28,166	6,102	669,291
April	27,120	5,904	575,342
May	30,767	4,438	689,082
June	24,432	4,335	655,395
July	22,664	4,305	677,147
August	27,126	5,019	722,079
September	28,066	6,394	709,288
October	28,798	9,679	796,544
November	32,520	12,202	880,633
December	30,714	25,594	1,021,957
Totals	341,286	103,847	8,859,631
Production of mines not reporting, estimated			130,000
			8,989,631

PRODUCTION BY COUNTIES.

SHOWING INCREASE AND DECREASE.

Counties	1904	1905	Increase	Decrease
Boulder	750,303	874,596	124,293	.....
Delta	10,828	9,067	.....	.....
El Paso	251,303	202,094	.....	49,209
Fremont	282,174	556,320	274,146	.....
Garfield	191,582	144,207	.....	47,375
Gunnison	496,939	502,689	5,750	.....
Huerfano	1,109,724	1,362,096	252,372	.....
Jefferson	116,617	190,125	73,508	.....
Las Animas	2,895,801	4,379,071	1,483,270	.....
La Plata	138,012	153,733	15,721	.....
Mesa	29,550	40,105	10,555	.....
Montezuma	500	395	.....	105
Pitkin	264,600	341,286	76,686	.....
Weld	108,618	103,847	.....	4,771
Mines not reporting—product estimated	130,000	130,000	.....	.....
Total tonnage	6,776,551	8,989,631	.....	.....

Increase for 1905, 2,213,080 tons.

PRODUCTION OF THE STATE OF COLORADO, 1905.

SHOWING MONTHLY AND YEARLY PRODUCTION OF THE DIFFERENT VARIETIES.

Months	Lignite	Semi-Bituminous	Bituminous	Anthracite	Total Tonnage
January	130,661	65,389	545,672	5,920	747,642
February	129,057	65,431	518,866	1,877	715,231
March	108,399	33,323	524,457	3,112	669,291
April	92,364	36,448	444,256	2,274	575,342
May	77,504	59,760	550,096	2,022	689,082
June	63,894	61,236	527,588	2,767	655,385
July	63,257	61,507	546,711	5,672	677,147
August	78,090	61,008	572,961	10,020	722,079
September	94,149	53,991	554,110	7,038	709,288
October	152,460	62,839	573,772	7,473	796,544
November	171,354	73,795	624,891	10,593	880,633
December	210,258	100,283	706,517	4,899	1,021,957
Totals	1,371,057	735,010	6,689,897	63,667	8,859,631
Unclassified coal, estimated					130,000
Total					8,989,631

TABLE.

SHOWING THE TOTAL PRODUCTION OF DIFFERENT COMPANIES OPERATING TWO OR MORE MINES, FOR THE YEAR 1905.

	Character of Coal and Number of Mines.								
Name of Company	No. of Mines	Bituminous or Coking	No. of Mines	Semi-Bituminous or Non-Coking	No. of Mines	Anthracite	No. of Mines	Lignite	Total in Tons of 2,000 Lbs.
Colorado Fuel & Iron Co.....	16	3,572,691	5	380,174	2	55,107	..	.....	4,007,972
Victor Fuel Co.....	5	1,208,415	2	75,108	..	.....	..	.....	1,283,523
Northern Coal & Coke Co.....	3	76,543	..	.....	..	.....	10	629,386	705,929
Continental Fuel Co.....	1	169,364	1	81,698	..	.....	1	45,558	296,620
Rocky Mountain Fuel Co.....	7	227,251	1	39,676	..	.....	..	.....	266,927
Union Coal & Coke Co.....	3	240,250	..	.....	..	.....	..	.....	240,250
Porter Fuel Co.....	1	59,547	1	52,987	..	.....	..	.....	112,534
Pike's Peak Fuel Co.....	..	.....	..	.....	..	.....	2	89,550	89,550
Cedar Hill Coal & Coke Co.....	2	83,224	..	.....	..	.....	..	.....	83,224
Green Canon Coal Co.....	2	74,305	..	.....	.	.....	..	.....	74,305
Huerfano Coal Co.....	2	56,100	..	.....	..	.....	..	.....	56,100
Gold King Cons. Mines Co.....	2	33,338	..	.....	..	.....	..	.....	33,338
Kirkmeyer Bros.....	..	.....	..	.....	..	.....	2	15,280	15,280
Williamsburg Slope Coal Co.....	..	.....	2	9,292	..	.....	..	.....	9,292

COKE PRODUCTION, 1905.

Name of Operator	Location of Ovens	County	No. of Ovens	Tonnage
Colorado Fuel & Iron Co.	Cardiff	Garfield	166	59,631
Colorado Fuel & Iron Co.	Crested Butte	Gunnison	154	45,810
Colorado Fuel & Iron Co.	Segundo	Las Animas	809	305,900
Colorado Fuel & Iron Co.	Starkville	Las Animas	192	93,064
Colorado Fuel & Iron Co.	El Moro	Las Animas	238	108,104
Colorado Fuel & Iron Co.	Sopris	Las Animas	272	144,941
Colorado Fuel & Iron Co.	Tercio	Las Animas	600	112,190
Colorado Fuel & Iron Co.	Tobasco	Las Animas	302	127,624
Colorado Fuel & Iron Co.	Redstone	Pitkin	249	40,789
Victor Fuel Co.	Delagua	Las Animas	80	8,795
Victor Fuel Co.	Hastings	Las Animas	189	55,422
Victor Fuel Co.	Gray Creek	Las Animas	100	37,826
American Smelting & Refining Co.	Durango	La Plata	34	11,741
			3,376	1,151,837

REMARKS.

The Cardiff ovens are supplied by Spring Gulch mine.
The El Moro ovens are supplied by the Engle mine.
The Redstone ovens are supplied by the Coal Basin mine.
The Segundo ovens are supplied by the Primero mine.
The Durango ovens are supplied by the Porter mine.
The coal of Huerfano county is classed as bituminous or coking, but is in fact only a semi-coking coal.

COKE PRODUCTION, 1905.

BY COMPANIES AND COUNTIES.

Companies	Total Number of Ovens	Total Tonnage
Colorado Fuel & Iron Co	2,973	1,038,053
Victor Fuel Co	369	102,043
American Smelting and Refining Co	34	11,741
	3,376	1,151,837

Counties	Total Number of Ovens	Total Tonnage
Las Animas	2,773	993,866
Garfield	166	59,631
Gunnison	154	45,810
Pitkin	249	40,789
La Plata	34	11,741
	3,376	1,151,837

List of Fatal Accidents for 1905.

FATAL ACCIDENTS IN 1905.

UNDERGROUND.

Date	Name of Person	Nationality	Occupation	Age	Married or Single	Name of Mine	County	Cause of Accident
Jan. 9	William Ord	Scotch	Miner	30	Married	City	La Plata	Fall of roof
Jan. 30	Mat Brown	American	Machine man's helper	30	Married	Leyden	Jefferson	Fall of coal
Feb. 13	Joe Nordon	Austrian	Miner	26	Married	Sopris	Las Animas	Fall of roof
Feb. 15	John Smelomitch	Austrian	Machine runner	23	Married	Robinson	Huerfano	Electrocuted by electric wire
Feb. 21	Gus Mates	Austrian	Miner	26	Single	Tercio	Las Animas	Fall of coal
Feb. 24	Abe Taylor	Colored	Miner	36	Single	Brookside	Fremont	Fall of coal and rock
Mar. 2	Valentine Zucknioster	Austrian	Miner	50	Single	Starkville	Las Animas	Run over by a trip of cars
Mar. 13	K. Nakatani	Japanese	Miner	35	Married	Walsen	Huerfano	Fall of roof
Mar. 15	Frank Martinchi	Italian	Driver	19	Single	Spring Gulch	Pitkin	Fell under trip of moving cars
Mar. 20	Aaron Park	English	Miner	39	Married	New Baker	Boulder	Fall of rock
Mar. 31	Vital Rosier	French	Miner	32	Single	Anthracite	Gunnison	Fall of rock
Mar. 31	Gregorio Morelli	Italian	Miner	15	Single	Primero	Las Animas	Fall of coal
Apr. 3	Joe Merino	Italian	Miner	29	Married	Beacon (Cuckoo)	Fremont	Suffocation from powder smoke
Apr. 10	Jake Clarich	Austrian	Miner	26	Single	Crested Butte	Gunnison	Fall of top coal
Apr. 13	J. M. Martinez	Mexican	Miner	35	Married	Midway	Huerfano	Fall of rock
Apr. 17	Richard Ablett	Welsh	Miner	43	Married	Engle	Las Animas	Fall of roof
Apr. 21	John Vodnic	Slavonian	Miner	25	Single	Primero	Las Animas	Fall of coal

Apr. 24	John H. Stribley	English	Fire boss	46	Married	Rockvale	Fremont ... Fell, cage to bottom of shaft
May 5	John O'Neil	American	Pit boss	32	Single	Starkville	Las Animas ... Fall of roof
May 5	James Roe	Scotch	Road & Timberman	61	Married	Starkville	Las Animas ... Fall of roof
May 5	Frank Carmeletto	Italian	Miner	45	Married	Starkville	Las Animas ... Fall of roof
May	James Dallop	Austrian	Miner	45	Single	Greenville	Las Animas ... Fall of roof
May 11	Frank Serejak	Slavonian	Miner	44	Married	Majestic	Las Animas ... Fall of roof
June 3	Angelo Mattine	Italian	Miner	29	Single	Midway	Huerfano ... Fall of rock
June 5	John Stolch	Austrian	Miner	38	Single	South Canon	Garfield ... Fall of top coal
June 13	John Brown	American	Miner	40	Married	Robinson	Huerfano ... Fall of rock
June 26	Tony Rotchio	Italian	Miner	39	Married	Magnet	Fremont ... Delayed shot
June 26	Mike W. Burke	Irish	Timberman	42	Single	Bowen	Las Animas ... Struck by a trolley wire, electrocuted
July 1	John Wanski	Polander	Miner	24	Single	Starkville	Las Animas ... Electrocuted by a trolley wire
July 8	Scepan Kuznik	Polander	Miner	20	Single	Sopris	Las Animas ... Fall of coal
July 17	William Whiles	English	Miner	65	Married	Pinon	Huerfano ... Fall of roof
July 19	Casino Cefano	Italian	Miner	35	Married	Hastings No. 2	Las Animas ... Fall of rock
July 23	Nick Dalduc	Italian	Driver	20	Single	Tercio	Las Animas ... Caught between trip of cars and rib
July 31	Tony Gringri	Italian	Miner	35	Single	Midway	Huerfano ... Fall of rock
Aug. 2	Bartalo Rudelatte	Italian	Timberman	28	Married	Starkville	Las Animas ... Fall of roof
Aug. 14	David Baxter	American	Driver	19	Single	Rugby	Huerfano ... Run over by a trip of cars
Aug. 15	James Tebarte	Italian	Miner	23	Single	Stevens	Las Animas ... Fall of rock

FATAL ACCIDENTS IN 1905—Continued.

UNDERGROUND.

Date	Name of Person	Nationality	Occupation	Age	Married or Single	Name of mine	County	Cause of Accident
Aug. 17	Joseph Petrie	Austrian	Miner	30	Single	Rouse	Huerfano	Fall of roof
Aug. 19	John Grisola	Slavonian	Miner	25	Single	Delagua	Las Animas	Fall of roof
Aug. 23	Peter Hayes	Scotch	Miner	44	Married	Coalbasin	Pitkin	Fall of roof
Sept. 1	Martin Balutis	Russian	Miner	22	Single	Tercio	Las Animas	Fell from airshaft, due probably to heart failure
Sept. 11	Jake Boytz	Slavonian	Miner	35	Single	Primero	Las Animas	Electrocuted by trolley wire
Sept. 13	Joe Kapitovich	Austrian	Miner	22	Single	Delagua	Las Animas	Fall of coal
Sept. 14	Leonard Bonaletti	Italian	Miner	35	Not known	Hezron	Huerfano	Fall of roof
Sept. 15	Paul Scholtez	Slavonian	Miner	33	Married	Midway	Huerfano	Fall of rock
Sept. 15	S. Takamiya	Japanese	Miner	30	Single	Majestic	Las Animas	Fall of rock
Sept. 15	W. H. Widener	American	Miner	24	Married	Spring Gulch	Pitkin	Fall of top coal
Sept. 20	Dominic Laranzo	Italian	Miner	40	Married	Pryor	Huerfano	Fall of rock
Oct. 13	Frank Banko	Polander	Miner	23	Single	Sopris	Las Animas	Fall of top coal
Nov. 2	John Gondino	Italian	Miner	35	Married	Hastings	Las Animas	Crushed between two loaded cars
Nov. 2	Frank Pialo	Italian	Miner	23	Single	Champion	La Plata	Fall of roof
Nov. 18	John Allero	Italian	Miner	33	Married	Rex No. 2	Boulder	Fall of roof
Nov. 21	David Ferguson	Scotch	Timberman	39	Married	Rugby	Huerfano	Fall of rock
Nov. 22	John Matrongo	Italian	Driver	20	Single	Delagua	Las Animas	Crushed between car and prop while spragging

Date	Name of Person	Nationality	Occupation	Age	Married or Single	Name of mine	County	Cause of Accident
Nov. 28	Joe Trujillo	Mexican	Driver	36	Married	Delagua	Las Animas	Crushed between loaded car and rib
Dec. 12	Tony Julian	Italian	Driver	24	Married	Primero	Las Animas	Head crushed between top of loaded car and cross-bar
Dec. 14	Jno. Meshik	German	Miner	56	Married	Delagua	Las Animas	Premature shot
Dec. 25	Guillermo Montalvo	Mexican	Miner	22	Single	Majestic	Las Animas	Fall of roof
Dec. 26	John Kramer	German	Miner	62	Single	Radiant	Fremont	Premature shot

SURFACE.

Date	Name of Person	Nationality	Occupation	Age	Married or Single	Name of mine	County	Cause of Accident
Jan. 1	Frank Brandelburg	Italian	Car-dropper	22	Single	Tobasco	Las Animas	Crushed between two loaded cars on track outside
Jan. 14	Felix Giere	Italian	Loader	30	Not known	Pikeview	El Paso	Explosion of radiator in engine house
Jan. 14	George Massina	Italian	Loader	35	Not known	Pikeview	El Paso	Explosion of radiator in engine house
Feb. 6	Charlie Roso	Italian	Larry-dropper	22	Single	Tercio coke ovens	Las Animas	Run over by a larry on gravity plane
Apr. 19	James Traylor	American	Cager	30	Married	Cross	Jefferson	Fell down shaft
May 24	Andrew Salavan	Slavonian	Miner	27	Single	Primero	Las Animas	Injured by fall of slate; recovered, but took pneumonia
July 17	Samuel Jaccino	Italian	Scale cleaner	40	Married	Delagua	Las Animas	Caught between buffers of two cars

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Simpson	Mitchell	Gladstone	Hecla
Thickness of vein	14 ft	6 to 10 ft.	12 ft.	6 ft.
Kind of opening	Shaft	Shaft	Shaft	Shaft
Character of coal	Lignite	Lignite	Lignite	Lignite
January	26,517	6,267	1,287	6,636
February	7,903	3,346	1,369	3,842
March	14,863	3,698	1,060	5,228
April	16,717	4,542	84	2,815
May	11,611	3,621	Abandoned	1,940
June	11,110	2,621	....	1,564
July	12,659	2,576	....	2,247
August	14,520	3,393	....	3,020
September	21,792	5,723	....	5,339
October	27,741	7,080	....	9,886
November	27,498	6,631	....	9,482
December	27,498	6,631	....	9,482
Totals	220,429	56,129	3,800	61,481

BOULDER COUNTY, 1906.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Rex No. 1	Rex No. 2	Gorham	Industrial	Acme	Monarch
7 ft.	7 ft.	6 ft.	6 ft.	6 ft. 6 in.	5 to 7 ft.
Shaft	Shaft	Shaft	Shaft	Shaft	Shaft
Lignite	Lignite	Lignite	Lignite	Lignite	Lignite
10,941	8,281	5,522	7,167	9,611	12,066
6,018	5,452	3,878	3,757	5,804	12,072
9,499	6,249	4,691	4,950	9,156	13,727
3,659	2,625	3,196	2,498	4,716	8,220
3,420	2,936	2,534	1,473	4,139	7,593
2,532	2,829	2,300	1,683	3,496	7,405
3,187	3,301	2,236	Closed	3,329	6,391
2,669	3,896	2,815	down for	3,825	8,273
10,504	7,363	4,845	repairs	13,990	10,450
17,222	9,474	6,949	5,136	19,790	13,497
17,043	8,339	7,596	10,316	18,695	12,762
17,043	8,339	7,600	10,316	18,695	13,250
103,737	69,075	54,162	47,296	115,246	125,706

PRODUCTION OF BOULDER

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Strathmore	Haywood
Thickness of vein	6 to 10 ft.	5 ft. 6 in. to 6 ft. 6 in.
Kind of opening	Shaft	Shaft
Character of coal	Lignite	Lignite
January	6,100	3,000
February	5,400	2,200
March	4,202	3,000
April	3,310	2,174
May	2,281	683
June	2,139	1,030
July	2,180	1,500
August	2,177	1,950
September	3,098	2,100
October	3,709	1,500
November	4,324	3,030
December	5,000	3,000
Totals	43,920	25,167

COUNTY, 1906—Continued

OF EACH MINE IN TONS OF 2,000 POUNDS.

Matchless	Fox	Standard	Sunnyside	Black Diamond	Shanhan
5 ft.	9 ft.	7 to 8 ft.	5 ft.	11 ft.	11 ft.
Shaft	Shaft	Shaft	Shaft	Slope	Slope
Lignite	Lignite	Lignite	Lignite	Lignite	Lignite
5,744	4,569	2,563	2,515	1,050	300
3,722	2,220	2,461	3,240	1,100	550
5,640	3,558	5,380	946	800	300
2,487	1,377	6,177	346	800	300
2,170	2,060	1,676	614	500	250
1,891	1,639	1,534	711	600	300
1,583	1,119	2,009	957	650	200
2,714	1,744	4,216	1,006	600	250
3,498	3,041	7,972	258	675	300
4,884	6,463	10,824	265	750	325
4,496	5,803	12,300	687	730	300
5,500	6,000	12,300	680	800	400
44,329	39,593	69,412	12,225	9,055	3,775

PRODUCTION OF BOULDER

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Centennial	Park Dale (Blue Ribbon)
Thickness of vein	6 ft.	12 ft.
Kind of opening	Shaft	Slope
Character of coal	Lignite	Lignite
January	New Mine	650
February	127	526
March	136	488
April	250	294
May	508	111
June	866	44
July	845	90
August	1,599	60
September	1,187	142
October	1,259	65
November	1,596	176
December	1,800	300
Totals	10,173	2,946

COUNTY, 1906—Concluded.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Rosser No. 7	Independent	New Baker	Vaughn	Senator	
7 ft.	5 ft.			5 to 8 ft.	
Slope	Shaft	Slope	Shaft	Shaft	
Lignite	Lignite	Lignite	Lignite	Lignite	Total Tonnage
394	840	257	254	....	122,531
826	840	425	196	....	77,274
785	800	682	Closed down	....	99,838
530	800	370	....	....	68,287
511	540	....	....	....	51.171
588	450	....	....	....	47.332
535	500	....	....	....	48.094
344	360	....	....	....	59,431
586	500	....	....	....	103,363
714	399	....	....	....	147,932
746	500	....	....	New mine	153,050
700	500	300	....	600	.....
7,259	7,029	2,034	450	600	1,135,028

PRODUCTION OF DELTA COUNTY, 1906.

SHOWING YEARLY PRODUCTION OF MINE IN TONS OF 2,000 POUNDS.

	King	
Name of mine	(formerly Juanita)	
Thickness of vein	11 to 12 ft.	
Kind of opening	Drift	
Character of coal	Bituminous	Total Tonnage
December	1,049	1,049
Totals	1,049	1,049

PRODUCTION OF DOUGLAS COUNTY, 1906.

SHOWING YEARLY PRODUCTION OF MINE IN TONS OF 2,000 POUNDS.

Name of mine	Platte Canon	
Thickness of vein	8 ft.	
Kind of opening	Shaft	
Character of coal	Lignite..	Total Tonnage
December	1,614	1,614
Totals	1,614	1,614

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Curtis	Rapson No. 2	Pikeview	Danville
Thickness of vein	17 ft.	7 to 9 ft.	12 ft.	10 ft.
Kind of opening	Shaft	Shaft	Shaft	Shaft
Character of coal	Lignite	Lignite	Lignite	Lignite
January	4,954	3,774	3,402	5,380
February	4,615	2,620	3,413	5,381
March	5,883	3,322	5,100	4,800
April	3,554	3,715	2,000	3,350
May	1,790	1,110	2,473	2,919
June	1,663	1,150	2,337	2,549
July	1,764	1,356	1,818	2,449
August	2,034	1,396	2,600	2,100
September	2,826	2,630	2,950	3,016
October	4,828	3,421	4,165	5,107
November	5,678	4,539	5,998	6,771
December	6,000	5,500	5,990	6,800
Totals	45,589	34,533	42,246	50,622

EL PASO COUNTY, 1906

OF EACH MINE IN TONS OF 2,000 POUNDS.

Williamsville	Tudor	Franceville	Patterson	Enterprise	
6 to 7 ft.	5 ft. 6 in.	5 to 7 ft.	16 ft.	2 ft. 6 in. to 3 ft. 6 in.	
Shaft	Shaft	Shaft	Shaft	Shaft	
Lignite	Lignite	Lignite	Lignite	Lignite	Total Tonnage
1,235	872	...	960	215	20,792
1,055	860	....	1,020	107	19,071
1,398	1,020	....	1,446	Closed Down	22,969
895	361	....	620	....	14,495
553	198	....	567	....	9,610
301	163	....	490	....	8,653
255	147	....	628	....	8,417
350	182	....	572	....	9,234
869	310	....	660	....	13,261
1,210	828	....	1,500	....	21,059
1,200	992	....	2,000	....	27,178
1,200	800	1,125	2,000	....	29,415
10,521	6,733	1,125	12,463	322	204,154

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Brookside	Rockvale	Coal Creek
Thickness of vein	5 ft.	4 ft.	4 ft.
Kind of opening	Slope	Shaft	Slope
Character of coal	Semi-bit.	Semi-bit.	Semi-bit.
January	5,494	18,187	9,019
February	3,444	13,770	7,753
March	4,391	12,065	8,127
April	5,979	16,352	7,059
May	5,662	21,777	6,654
June	5,868	20,245	8,122
July	5,192	21,071	8,367
August	6,483	9,008	8,884
September	5,748	8,551	7,254
October	6,341	16,626	10,109
November	4,675	10,566	9,552
December	4,700	10,500	9,600
Totals	63,977	178,718	100,500

FREMONT COUNTY, 1906.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Fremont	Nonac	Chandler	Radiant	Magnet	Beacon
4 ft.	4½ ft.	5 ft.	3½ ft.	4½ ft.	3½ to 4½ ft.
Shaft	Slope	Shaft	Slope	Slope	Shaft
Semi-bit.	Semi-bit.	Semi-bit.	Semi-bit.	Semi-bit.	Semi-bit.
7,493	6,482	8,422	2,330	4,142	1,152
6,265	4,604	7,318	2,043	3,778	1,422
5,832	2,019	6,288	631	4,071	1,756
5,005	2,767	7,796	1,361	4,427	1,744
3,526	1,911	7,732	1,910	5,584	1,870
5,906	466	8,143	1,706	5,157	2,400
6,138	598	8,285	1,811	4,300	2,714
6,020	410	9,086	2,138	3,547	2,604
5,423	1,683	7,684	2,161	3,419	2,620
8,269	3,866	9,671	2,368	3,590	2,960
7,818	4,142	7,909	2,274	3,285	3,758
8,000	4,200	8,000	2,500	3,500	3,000
75,695	33,148	96,334	23,233	48,802	28,000

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Royal Gorge	Peanut	Williams-burg slope
Thickness of vein	3½ to 4½ ft	4¼ ft.	4¼ ft.
Kind of opening	Slope	Shaft	Slope
Character of coal	Semi-bit.	Semi-bit.	Semi-bit.
January	3,050	400	720
February	1,620	288	630
March	2,541	Idle	675
April	1,575	....	352
May	1,325	....	460
June	1,750	....	422
July	1,675	....	....
August	1,508	....	Not reporting
September	1,050	....	for 6 mos.
October	4,500	....	....
November	4,200	....	....
December	4,000	150	3,165
Totals	28,794	838	6,424

FREMONT COUNTY, 1906—Concluded.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Florence	Bluff Springs	Horseshoe	Walsh	Cowan	
3 ft. 2 in.	4 ft.	4½ ft.	4 ft.		
Drift	Slope	Slope	Air-shaft & slope	Drift	
Semi-bit.	Semi-bit.	Semi-bit.	Semi-bit.	Semi-bit.	Total tonnage
516	1,738	751	377	177	70,450
508	1,246	489	300	177	55,655
362	Idle	528	309	178	49,773
310	....	421	250	Not producing	55,398
346	....	78	240	Not producing	59,075
350	...	162	250	297	61,244
361	....	174	240	286	61,212
412	....	196	335	90	50,721
267	....	71	250	193	46,374
397	....	217	250	276	69,442
562	....	477	300	249	59,767
500	....	400	350	200	62,765
4,891	2,984	3,964	3,451	2,123	701,876

PRODUCTION OF GARFIELD COUNTY, 1906.

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

Name of mine....	Coryell	Midland	Pocahontas	South Canon	Keystone	
Thickness of vein	13 ft.	6 to 7 ft.	8 ft. 6 in. to 16 ft. and 4 ft. 7 in.	3 veins 17 ft. 8 in., 19 ft. 5 in.	2 ft.	
Kind of opening	Drift	Drift	Drift	Drift	Slope	
Character of coal.	Bitum.	Bitum.	Bitum.	Bitum.	Bitum.	Total Tonnage
January	3,562	6,454	4,515	5,777	600	20,908
February	1,915	6,874	3,402	4,708	800	17,699
March	396	7,778	2,919	3,159	900	15,152
April	770	7,090	1,866	4,634	50	14,410
May	1,056	6,427	984	4,932	50	13,449
June	1,093	6,213	1,555	5,315	....	14,176
July	1,512	5,377	2,122	5,797	....	14,808
August	2,712	7,460	2,597	4,442	....	17,211
September	3,685	6,191	2,511	3,243	....	15,630
October	4,875	6,414	2,890	4,578	....	18,757
November	4,869	4,540	2,118	4,600	....	16,127
December	4,869	4,540	2,120	4,700	400	16,629
Totals	31,314	75,358	29,599	55,885	2,800	194,956

PRODUCTION OF GUNNISON COUNTY, 1906.

SHOWING MONTHLY AND YEARLY PRODCTION OF EACH MINE IN TONS OF 2,000 LBS.

Name of mine	Crested Butte	Anthracite	Floresta	Alpine	Somerset	Silver Brook	Porter	
Thickness of vein	9 ft.	3 ft.	3 ft.	5 ft. to 7 ft.	7 ft.	3 ft.	15 ft.	
Kind of opening	Slope	Drift	Drift	Drift	Slope	Drift	Drift	
Character of coal	Bituminous	Anthracite	Anthracite	Semi-bit.	Bitum.	Anthracite	Bitum.	Total Tonnage
January	16,591	2,877	....	9,500	18,014	800	1,448	49,230
February	16,530	2,697	....	9,427	16,127	645	1,264	46,690
March	16,839	1,149	....	3,338	19,302	60	700	41,388
April	16,226	2,708	....	4,322	18,957	Idle	1,595	43,808
May	17,555	2,544	....	8,364	14,523	200	1,860	45,046
June	15,767	2,359	....	6,807	17,463	1,005	1,979	45,380
July	14,709	1,580	4,620	9,682	13,657	620	2,019	46,887
August	13,087	1,630	6,934	10,863	15,577	601	2,400	51,092
September	13,855	1,517	6,372	9,105	18,586	789	1,991	52,215
October	12,998	1,551	6,582	10,932	19,418	800	1,900	54,181
November	13,156	1,694	6,229	9,975	20,447	850	2,000	54,351
December	14,000	1,700	6,230	10,200	20,446	1,000	3,000	56,576
Totals	181,313	24,006	36,967	102,515	212,517	7,370	22,156	586,844

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Pictou	Robinson	Walsen	Rouse
Thickness of vein	9 ft.	7 ft.	6 ft.	5 ft. 6 in.
Kind of opening	Slope	Slope	Slope	Slope
Character of coal	Bituminous	Bituminous	Bituminous	Bituminous
January	17,137	19,000	15,003	18,662
February	15,675	14,494	13,759	18,764
March	15,742	18,175	16,094	19,227
April	21,614	16,717	14,432	16,720
May	23,701	18,760	16,067	16,661
June	21,658	14,332	14,311	17,917
July	20,121	17,081	14,111	14,787
August	20,906	19,079	15,549	16,795
September	16,902	16,791	13,930	16,489
October	16,170	17,034	14,611	17,707
November	16,192	16,106	13,562	15,427
December	16,200	16,106	13,560	15,430
Totals	222,018	203,675	174,989	204,586

HUERFANO COUNTY, 1906.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Hezron	Maitland	Pryor	Champion	Toltec	Midway
4 2 in.	6 ft.	5 ft. to 7 ft.	4 ft. 6 in.	3 ft. 6 in.	6 ft.
Drift	Slope	Slope	Slope	Slope	Slope
Bituminous	Bituminous	Bituminous	Bituminous	Bituminous	Bituminous
6,060	11,670	8,845	2,527	5,946	11,208
5,203	8,324	6,365	1,933	4.327	11,308
6,405	9,634	5,992	190	6,634	13,695
5,802	10,310	7,675	2,180	5,717	9,370
6,360	13,753	7,945	2,593	4,212	14,631
6,083	12,582	8,624	2,430	7,259	13,789
5,356	10,106	7,915	2,275	7,025	11,906
5,949	13,905	9,622	2,206	7,700	12,577
5,609	12,075	9,705	1,737	6,872	11.423
5,665	9,747	10,206	1,157	6,551	12,256
5,040	11,402	10,214	1,280	7,771	9.804
5,040	12,000	10,000	2.000	7,050	10,000
68,572	135,508	103,108	22,508	77,064	141,967

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Rugby	Sweet	Sunnyside	Huerfano
Thickness of vein	4 ft.	4 ft. 6 in. to 6 ft.	7 ft.6 in. to 8 ft.	6 ft.
Kind of opening	Slope	Slope	Slope	Shaft, Drift
Character of coal	Bituminous	Bituminous	Bituminous	Bituminous
January	9,247	4,725	6,966	2,800
February	7,488	1,178	2,676	2,278
March	6,356	766	5,643	2,180
April	8,117	1,300	5,755	2,369
May	7,598	Idle	4,946	1,172
June	7,785	.....	4,867	1,079
July	7,264	868	5,039	3,458
August	7,175	2,188	6,144	4,142
September	7,376	2,880	5,974	3,738
October	6,578	2,182	5,549	3,738
November	8,419	3,420	5,335	3,673
December	8,000	3,500	6,000	3,670
Total	91,403	23,007	64,894	34,298

HUERFANO COUNTY, 1906—Concluded.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Pinion No. 1 3 ft. to 4 ft. Slope Bituminous	Pinon No. 2 3 ft. to 4 ft. Slope Bituminous	Occidental 6 ft. 6 in. Slope Bituminous	Black Canon Slope Bituminous	Korte 2 ft. 8 in. Slope Bituminous	Total Tonnage
5,916	1,670	1,551	611	1,100	150,644
4,782	815	1,215	441	670	121,695
1,993	1,594	1,053	Closed Down	90	131,463
4,055	211	749	.....	Idle	133,093
4,437	Closed	1,236	.....	.....	144,072
5,543	.....	1,422	.....	.....	139,681
4,392	.....	891	.....	1,000	133,595
4,828	.....	1,330	.....	1,000	151,096
3,747	454	772	.....	1,000	137,474
5,087	558	635	.....	1,000	136,431
4,392	508	570	.....	1,690	134,805
4,400	550	570	.....	950	135,026
53,572	6,360	11,994	1,052	8,500	1,649,075

PRODUCTION OF JEFFERSON COUNTY, 1906.

SHOWING MONTHLY AND YEARLY PRODUCTION OF THE LEYDEN MINE IN TONS OF 2,000 POUNDS.

Name of mine	Leyden	
Thickness of vein	9 ft.	
Kind of opening	Shaft	
Character of coal	Lignite	Total
January	21,248	21,248
February	17,342	17,342
March	21,280	21,280
April	15,001	15,001
May	15,630	15,630
June	14,767	14,767
July	14,654	14,654
August	15,116	15,116
September	17,152	17,152
October	19,903	19,903
November	19,630	19,630
December	22,000	22,000
Totals	213,723	213,723

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Primero	Starkville	Sopris	Engle
Thickness of vein	6 to 7 ft.	7 ft.	3 ft. 6 in. to 4 ft. 6 in.	7 ft.
Kind of opening	Drift	Drift	Drift	Drift
Character of coal	Bitum.	Bitum.	Bitum.	Bitum.
January	47,416	29,249	15,150	29,139
February	43,220	28,153	12,649	28,063
March	53,666	31,837	14,941	32,022
April	40,292	28,388	13,001	26,589
May	45,295	26,085	15,180	20,684
June	44,947	27,090	13,896	11,705
July	43,923	29,199	12,393	15,405
August	48,191	30,697	12,683	17,178
September	42,054	17,456	11,254	14,048
October	47,389	29,307	8,338	18,338
November	41,274	28,914	8,237	13,991
December	41,250	29,000	8,250	13,990
Totals	538,917	335,375	145,972	241,152

LAS ANIMAS COUNTY, 1906.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Berwind	Tobasco	Tercio	Cuatro	Quinto	Hastings No. 2
6 ft.	4 ft.	4 to 6 ft.	4 ft.	5 ft.	5 to 8 ft.
Drift	Slope	Drift	Drift	Drift	Slope and Drift
Bitum.	Bitum.	Bitum.	Bitum.	Bitum.	Bitum.
41,129	10,229	25,489	10,614	New Mine	39,292
39,186	8,908	22,896	9,500	3,039	34,541
43,484	9,581	22,150	11,866	4,167	43,012
40,935	8,286	16,302	7,911	4,291	36,305
41,176	8,877	17,621	7,696	6,460	41,377
41,398	8,703	19,933	7,708	6,407	35,996
27,232	6,214	20,179	5,104	6,451	33,368
40,537	7,782	22,656	5,277	7,298	36,264
36,761	6,826	21,028	4,352	6,788	36,500
41,215	10,582	22,018	4,848	6,801	39,149
39,154	9,876	20,945	5,473	6,904	34,806
39,200	9,850	20,950	5,475	6,900	38,000
471,407	105,714	252,167	85,824	65,506	448,610

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Delagua	Gray Creek	Bowen	Majestic
Thickness of vein	6 ft.	5 ft.	8 ft.	5 to 9 ft.
Kind of opening	Drift	Drift	Drift	Drift
Character of coal	Bitum.	Bitum.	Bitum.	Bitum.
January	59,127	27,963	17,900	13,965
February	54,887	24,703	16,127	12,748
March	61,755	28,593	18,000	14,927
April	55,510	25,199	14,249	13,934
May	58,909	26,797	15,462	12,739
June	52,149	19,219	11,906	10,328
July	46,458	20,702	14,145	9,582
August	51,301	19,123	19,091	10,291
Septembr	46,852	14,964	19,768	7,865
October	50,426	14,978	19,512	6,991
November	47,105	15,159	17,666	6,610
December	50,000	15,500	19,000	7,000
Totals	634,479	252,900	202,826	126,980

LAS ANIMAS COUNTY, 1906—Continued.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Bloom	Brodhead	La Belle	Francisco	Piedmont	Primrose
7 ft.	4 ft.	5 ft.	4 ft.	4 ft. 6 in. to 6 ft.	4 ft.
Drift	Drift	Drift	Drift	Slope	Slope
Bitum.	Bitum.	Bitum.	Bitum.	Bitum.	Bitum.
3,426	8,450	3,225	1,104	7,264	8,322
2,614	6,890	2,915	1,785	6,575	5,171
2,864	7,250	2,818	1,430	7,832	5,850
2,152	8,000	1,939	2,200	8,356	5,620
1,909	Closed Down	1,870	3,070	9,172	6,534
1,738	....	1,884	4,195	8,646	5,018
1,885	....	2,126	4,545	9,307	4,767
2,040	....	2,831	5,304	9,111	5,409
1,767	608	2,600	4,846	8,347	5,887
2,071	5,256	3,406	5,273	10,593	3,504
2,476	8,006	3,827	5,179	9,802	5,047
2,500	7,000	3,900	5,200	9,800	5,500
27,442	51,370	33,341	44,131	104,805	66,629

PRODUCTION OF

SHOWING MONTHLY AND YEARLY PRODUCTION

Name of mine	Green Canon	Suffield	Black Diamond	Greenville
Thickness of vein	5 ft.	6 ft.	3 ft.	6 ft. 4 in.
Kind of opening	Drift and Slope	Drift	Slope	Drift
Character of coal	Bituminous	Bituminous	Bituminous	Bituminous
January	5,511	6,316	5,639	8,247
February	6,000	5,211	4,702	7,215
March	6,000	5,201	3,602	6,430
April	5,600	5,686	5,506	9,275
May	5,500	7,400	6,973	9,982
June	5,000	5,560	7,006	10,322
July	4,400	6,540	6,829	8,043
August	5,900	6,822	6,390	7,144
September	5,850	8,124	5,996	5,336
October	5,200	7,866	4,901	4,215
November	6,600	9,150	7,218	5,039
December	7,000	10,000	7,000	6,500
Totals	68,561	83,876	71,762	87,748

LAS ANIMAS COUNTY, 1906—Continued.

OF EACH MINE IN TONS OF 2,000 POUNDS.

Ludlow	Forbes	Valley	Stevens	Jewel	Southwestern
5 ft. 6 in.	6 ft.		5 ft. 6 in.	4 ft.	4 ft. 6 in.
Drift	Drift	Shaft	Shaft	Drift	Drift
Bituminous	Bituminous	Bituminous	Bituminous	Bituminous	Bituminous
5,699	17,042	3,664	419	600	....
5,365	16,740	3,157	441	800	....
4,961	2,037	3,350	445	1,000	....
5,563	17,238	Closed Down	574	600	....
5,864	21,610	.....	830	800	....
5,766	19,819	.....	325	1,100	....
5,335	19,286	.....	198	800	....
5,032	13,136	.....	177	1,000	....
5,056	18,600	.....	266	800	....
5,054	19,350	.....	432	800	....
6,002	17,605	.....	548	567	....
6,000	18,000	.....	700	600	9,950
65,697	200,463	10,171	5,355	9,467	9,950

PRODUCTION OF LAS ANIMAS COUNTY, 1906—Concluded.

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

Name of mine	Rapson No. 1	Sunlight	
Thickness of vein	4 ft.	4 ft. 8 in.	
Kind of opening	Drift	Drift	
Character of coal	Bituminous	Bituminous	Total Tonnage
January	.....	.....	451,590
February	.....	.....	414,111
March	.....	.....	451,071
April	.....	.....	409,501
May	.....	.....	425,872
June	.....	.....	387,764
July	.....	.....	364,416
August	.....	.....	298,665
September	.....	.....	360,599
October	.....	.....	397,813
November	.....	.....	383,180
December	5,609	400	410,024
Totals	5,609	400	4,854,606

PRODUCTION OF LA PLATA COUNTY, 1906.

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

Name of mine	Porter	Hesperus	Ute	City	Champion	Perin's Peak	
Thickness of vein	3 veins 8 ft. 7 in.	5 ft. to 5 ft. 6 in.	5 to 6 ft.	3 to 4 ft.	3 to 4 ft.	7 ft.	
Kind of opening	Drift	Drift	Drift	Drift	Tunnel	Drift	
Character of coal	Bituminous	Semi-Bituminous	Bituminous	Bituminous	Bituminous	Bituminous	Total Tonnage
January	6,847	7,110	699	1,346	1,317	....	17,319
February	6,571	6,503	287	1,501	1,665	1,725	18,252
March	5,180	5,303	194	1,646	1,544	1,463	15,330
April	2,838	4,566	262	1,348	1,221	2,194	12,429
May	2,578	3,911	128	933	1,121	4,620	13,291
June	2,255	3,040	....	810	1,027	3,707	10,839
July	3,892	4,648	....	1,165	1,120	4,015	14,840
August	3,887	4,648	....	1,349	1,570	3,643	15,097
September	3,689	5,105	....	1,079	1,172	2,988	14,033
October	3,910	5,935	....	988	1,605	3,381	15,819
November	3,725	6,553	....	1,123	1,415	2,966	15,782
December	4,000	7,000	....	1,200	1,300	3,000	16,500
Totals	49,372	64,322	1,570	14,488	16,077	33,702	179,531

PRODUCTION OF MESA COUNTY, 1906.

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

Name of mine	Book Cliff	Cameo	Stokes	Palisade	Riverside	Wearing	
Thickness of vein	7 ft.	5 ft.	3 ft. 8 in.	4 ft.	2 ft. 10 in.	5 ft.	
Kind of opening	Drift	Drift	Drift	Drift	Drift		
Character of coal	Semi-bit.	Semi-bit.	Semi-bit.	Semi-bit.	Semi-bit.	Semi-bit.	Total Tonnage
January	1,663	2,000	376	1,719	225	....	5,983
February	920	900	185	1,236	75	....	3,316
March	718	923	89	1,360	72	....	3,162
April	448	960	91	970	60	....	2,529
May	392	814	110	512	23	....	1,851
June	112	909	83	570	22	....	1,696
July	117	896	180	233	19	....	1,445
August	646	936	155	469	19	....	2,225
September	696	820	260	607	65	....	2,448
October	1,269	1,203	280	738	73	....	3,563
November	1,652	2,500	390	834	127	....	5,503
December	1,652	4,000	375	834	70	1,900	8,831
Totals	10,285	16,861	2,574	10,082	850	1,900	42,552

PRODUCTION OF MONTEZUMA COUNTY, 1906.

SHOWING YEARLY PRODUCTION OF THE MANCOS MINE IN TONS OF 2,000 POUNDS.

Name of mine	Mancos	
Thickness of vein	3 ft.	
Kind of opening	Drift	
Character of coal	Lignite	Total Tonnage
December	729	729
Total	729	729

PRODUCTION OF PITKIN COUNTY, 1906.

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

Name of mine	Spring Gulch	Coalbasin	
Thickness of vein	4 ft and 8 ft.	9 ft.	
Kind of opening	Slope	Slope	
Character of coal	Bituminous	Bituminous	Total Tonnage
January	23,349	7,610	30,959
February	21,724	10,540	32,264
March	21,474	2,819	24,293
April	19,504	3,246	22,750
May	22,145	7,915	30,060
June	18,870	10,309	29,179
July	16,300	10,448	26,748
August	14,510	11,501	26,011
September	13,654	9,765	23,419
October	13,460	11,028	24,488
November	13,543	10,274	23,817
December	13,600	10,300	23,900
Totals	212,133	105,755	317,888

PRODUCTION OF WELD COUNTY, 1906.

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

Name of mine.....	Lehigh	Whitehouse	Reliance	Washington	Eureka	Shamrock	Lister	Davies	Advance No. 1
Thickness of vein....	6 ft.	6 ft.	5 ft.	5 ft.	5 ft. 6 in.	11 ft.	4 ft.	5 ft.	6 ft.
Kind of opening....	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft	Shaft
Character of coal...	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite	Lignite
January	6,649	682	2,015	.....	.....	.....	749	.....	....
February	2,958	542	1,509	.....	.....	.....	745	.....	....
March	3,439	409	1,492	.....	.....	.....	999	.....	....
April	2,795	208	798	.....	.....	.....	810	.....	....
May	1,992	398	534	.....	.....	.....	855	.....	....
June	1,991	370	409	.....	.....	.....	560	.....	....
July	1,553	313	351	.....	.....	.....	585	.....	....
August	1,840	335	700	.....	.....	.....	714	.....	....
September	3,565	366	768	.....	.....	.....	938	.....	....
October	6,522	430	1,215	.....	.....	.....	1,097	.....	....
November	7,602	560	1,323	.....	.....	.....	1,014	.....	....
December	7,600	1,000	1,200	3,450	8,520	6,769	1,200	6,030	890
Totals	48,506	5,613	12,314	3,450	8,520	6,769	10,266	6,030	890

PRODUCTION OF WELD COUNTY, 1906—Concluded.

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

Name of mine	Northwestern	Golden Ash	
Thickness of vein	7 ft.	8 ft.	
Kind of opening	Shaft	Shaft	
Character of coal	Lignite	Lignite	Total Tonnage
January	Re-opened	.....	10,095
February	.....	28	5,782
March	100	193	6,632
April	.....	152	4,763
May	.....	169	3,948
June	.....	323	3,653
July	.....	441	3,243
August	225	450	4,264
September	803	452	6,892
October	1,072	430	10,766
November	2,800	.....	13,299
December	2,800	2,000	41,459
Totals	7,800	4,638	114,796

The Golden Ash mine was shut down in November for the purpose of putting in cages.

PRODUCTION OF THE STATE OF COLORADO, 1906.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY. ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

Counties	Boulder	Delta	Douglas	El Paso
January	122,531	.....	.....	20,792
February	77,274	.....	.....	19,071
March	99,838	.....	.....	22,969
April	68,287	.....	.....	14,495
May	51,171	.....	.....	9,610
June	47,332	.....	.....	8,653
July	48,094	.....	.....	8,417
August	59,431	.....	.....	9,234
September	103,363	.....	.....	13,261
October	147,932	.....	.....	21,059
November	153,050	.....	.....	27,178
December	156,725	1,049	1,614	29,415
Totals	1,135,028	1,049	1,614	204,154

PRODUCTION OF THE STATE OF COLORADO, 1906. —Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY. ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

	Fremont	Garfield	Gunnison	Huerfano
January	70,450	20,908	49,230	150,644
February	55,655	17,699	46,690	121,695
March	49,773	15,152	41,388	131,463
April	55,398	14,410	43,808	133,093
May	59,075	13,449	45,046	144,072
June	61,244	14,176	45,380	139,681
July	61,212	14,808	46,887	133,595
August	50,721	17,211	51,092	151,096
September	46,374	15,630	52,215	137,474
October	69,442	18,757	54,181	136,431
November	59,767	16,127	54,351	134,805
December	62,765	16,629	56,576	135,026
Totals	701,876	194,956	586,844	1,649,075

PRODUCTION OF THE STATE OF COLORADO, 1906. —Continued.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY. ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

	Jefferson	Las Animas	La Plata	Mesa
January	21,248	451,590	17,319	5,893
February	17,342	414,111	18,252	3,316
March	21,280	451,071	15,330	3,162
April	15,001	409,501	12,429	2,529
May	15,630	425,872	13,291	1,851
June	14,767	387,764	10,839	1,696
July	14,654	364,416	14,840	1,445
August	15,116	398,665	15,097	2,225
September	17,152	360,599	14,033	2,448
October	19,903	397,813	15,819	3,563
November	19,630	383,180	15,782	5,503
December	22,000	410,024	16,500	8,831
Totals	213,723	4,854,606	179,531	42,552

PRODUCTION OF THE STATE OF COLORADO, 1906. —Concluded.

SHOWING MONTHLY AND YEARLY PRODUCTION OF EACH COUNTY. ALL YEARLY REPORTS GROUPED IN THE MONTH OF DECEMBER.

	Montezuma	Pitkin	Weld	Total Tonnage
January	.....	30,959	10,095	971,749
February	.....	32,264	5,782	829,151
March	.....	24,293	6,632	882,351
April	.....	22,750	4,763	796,464
May	.....	30,060	3,948	813,075
June	.....	29,179	3,653	764,364
July	.....	26,748	3,243	738,359
August	.....	26,011	4,264	800,163
September	.....	23,419	6,892	792,860
October	.....	24,488	10,766	920,154
November	.....	23,817	13,299	906,489
December	729	23,900	41,459	983,242
Totals	729	317,888	114,796	10,198,421
Production from mines not reporting estimated				110,000
Grand total				10,308,421

PRODUCTION BY COUNTIES.

SHOWING INCREASE AND DECREASE.

Counties	1905	1906	Increase	Decrease
Boulder	874,596	1,135,028	260,432	.....
Delta	9,067	1,049	.....	8,018
Douglas	.....	1,614	1,614	.....
El Paso	202,094	204,154	2,060	.....
Fremont	556,320	701,876	145,556	.....
Garfield	144,207	194,956	50,749	.....
Gunnison	502,689	586,844	84,155	.....
Huerfano	1,362,096	1,649,075	286,979	.....
Jefferson	190,125	213,723	23,598	.....
Las Animas	4,379,071	4,854,606	475,535	.....
La Plata	153,733	179,531	25,798	.....
Mesa	40,105	42,552	2,447	.....
Montezuma	395	729	334	.....
Pitkin	341,286	317,888	.....	23,398
Weld	103,847	114,796	10,949	.....
Mines not reporting, product estimated	130,000	110,000	.....	20,000
Total tonnage	8,989,631	10,308,421		

Increase for 1906, 1,318,790 tons.

PRODUCTION OF THE STATE OF COLORADO, 1906.

SHOWING MONTHLY AND YEARLY PRODUCTION OF THE DIFFERENT VARIETIES.

Months	Lignite	Semi-Bituminous	Bituminous	Anthracite	Total Tonnage
January	174,666	93,043	700,363	3,677	971,749
February	119,469	74,901	631,439	3,342	829,151
March	150,719	61,576	668,847	1,209	882,351
April	102,546	66,815	624,395	2,708	796,464
May	80,359	73,201	656,771	2,744	813,075
June	74,405	72,787	613,808	3,364	764,364
July	74,408	76,987	580,144	6,820	738,359
August	88,045	68,457	634,496	9,165	800,163
September	140,668	63,032	580,482	8,678	792,860
October	199,660	89,872	621,689	8,933	920,154
November	213,157	81,798	602,761	8,773	906,489
December	251,942	88,796	633,574	8,930	983,242
Totals	1,670,044	911,265	7,548,769	68,343	10,198,421
Unclassified coal, estimated					110,000
Total					10,308,421

TABLE.

SHOWING THE TOTAL PRODUCTION OF DIFFERENT COMPANIES OPERATING TWO OR MORE MINES FOR THE YEAR 1906.

Name of Company	Character of Coal and Number of Mines—								Total in tons of 2,000 lbs.
	No. of Mines	Bituminous or Coking	No. of Mines	Semi-Bituminous or Non-Coking	No. of Mines	Anthracite	No. of Mines	Lignite	
Colorado Fuel & Iron Co	17	3,615,075	5	425,038	2	60,973	..	.....	4,128,086
Victor Fuel Co	5	1,674,323	2	119,567	..	.....	..	.....	1,793,890
Northern Coal & Coke Co	3	96,481	..	.....	..	.....	10	779,861	876,342
Rocky Mountain Fuel Co	7	347,166	1	48,802	..	.....	..	.....	395,968
Continental Fuel Co	1	126,980	1	102,515	..	.....	1	43,920	273,415
Cedar Hill Coal & Coke Co	2	159,510	..	.....	..	.....	..	.....	159,510
Green Canon Coal Co	2	152,437	..	.....	..	.....	..	.....	152,437
Union Coal & Coke Co	2	125,616	..	.....	..	.....	..	.....	125,616
Porter Fuel Co	1	49,372	1	64,322	..	.....	..	.....	113,694
Huerfano Coal Co	2	99,995	..	.....	..	.....	..	.....	99,995
Pike's Peak Fuel Co	..	.....	..	.....	..	.....	2	92,868	92,868
Rapson Coal Mining Co	1	5,609	..	.....	..	.....	1	34,533	40,142
Gold King Consolidated Mines Co	2	30,565	..	.....	..	.....	..	.....	30,565
The Pueblo Fuel & Mining Co	1	22,156	..	.....	1	7,370	..	.....	29,526
Kirkmeyer Bros.	..	.....	..	.....	..	.....	2	12,830	12,830
Williamsburg Slope Coal Co	..	.....	2	7,262	..	.....	..	.....	7,262

COKE PRODUCTION, 1906.

Name of Operator	Location of ovens	County	No. of ovens	Tonnage
Colorado Fuel & Iron Co.	Cardiff	Garfield	166	75,979
Colorado Fuel & Iron Co.	Crested Butte	Gunnison	154	54,429
Colorado Fuel & Iron Co.	Segundo	Las Animas	800	298,113
Colorado Fuel & Iron Co.	Starkville	Las Animas	192	89,702
Colorado Fuel & Iron Co.	El Moro	Las Animas	238	104,804
Colorado Fuel & Iron Co.	Sopris	Las Animas	272	144,266
Colorado Fuel & Iron Co.	Tercio	Las Animas	600	93,045
Colorado Fuel & Iron Co.	Tobasco	Las Animas	302	139,872
Colorado Fuel & Iron Co.	Redstone	Pitkin	249	28,544
Victor Fuel Co.	Hastings	Las Animas	189	49,136
Victor Fuel Co.	Gray Creek	Las Animas	100	41,653
Victor Fuel Co.	Delagua	Las Animas	80	1,200
American Smelting & Refining Co.	Durango	La Plata	34	12,900
			3,376	1,133,643

REMARKS.

Not all the above enumerated ovens were in operation.
The Cardiff ovens are supplied by Spring Gulch mine.
The El Moro ovens are supplied by the Engle mine.
The Redstone ovens are supplied by the Coalbasin mine.
The Segundo ovens are supplied by the Primero mine.
The Durango ovens are supplied by the Porter mine.
The coal of Huerfano county is classed as bituminous or coking, but is in fact only a semi-coking coal.

COKE PRODUCTION, 1906.

BY COMPANIES AND COUNTIES.

Companies	Total Number of Ovens	Total Tonnage
Colorado Fuel & Iron Co.	2,973	1,028,754
Victor Fuel Co.	369	91,989
American Smelting & Refining Co.	34	12,900
	3,376	1,133,643

Counties	Total Number of Ovens	Total Tonnage
Las Animas	2,773	961,791
Garfield	166	75,979
Gunnison	154	54,429
Pitkin	249	28,544
La Plata	34	12,900
	3,376	1,133,643

SUMMARY OF COAL PRODUCTION.

FROM 1873 TO 1906, INCLUSIVE.

Year	Tons	Year	Tons
1873	69,977	1890	3,075,781
1874	87,372	1891	3,512,632
1875	98,838	1892	3,771,234
1876	117,666	1893	3,947,056
1877	160,000	1894	3,021,028
1878	200,630	1895	3,339,495
1879	322,732	1896	3,371,633
1880	375,000	1897	3,565,660
1881	706,744	1898	4,174,037
1882	1,161,479	1899	4,826,939
1883	1,220,593	1900	5,495,734
1884	1,130,024	1901	6,210,405
1885	1,398,796	1902	7,522,923
1886	1,436,211	1903	7,775,302
1887	1,791,735	1904	6,776,551
1888	2,185,477	1905	8,989,631
1889	2,400,629	1906	10,308,421

List of Fatal Accidents for 1906.

FATAL ACCIDENTS IN 1906.

UNDERGROUND.

Date	Name of person	Nationality	Occupation	Age	Single or Married	Name of mine	County	Cause of accident
Jan. 2	Joonas Batki	Finlander	Miner	43	Married	Somerset	Gunnison	Fall of rock
Jan. 6	John Fortarel	Italian	Miner	40	Married	Rugby	Huerfano	Fall of rock
Jan. 13	G. Green	American	Machine helper	19	Single	Magnet	Fremont	Fall of rock
Jan. 25	Mike Ribor	Austrian	Miner	32	Married	Midway	Huerfano	Fall of rock
Jan. 26	John Stein	Slavonian	Shot-lighter	60	Married	Greenville	Las Animas	Premature shot
Feb. 7	James Baird	American	Miner	23	Single	Jewel	Las Animas	Fall of rock
Feb. 12	Jno. Rellick	Austrian	Miner	38	Married	City	La Plata	Fall of roof
Feb. 15	Frank Valentine	Austrian	Miner	40	Married	Suffield	Las Animas	Fall of rock
Feb. 16	G. Martinez	Mexican	Miner	..	.....	Quinto	Las Animas	Fall of rock
Feb. 16	A. Tapia	Mexican	Miner	..	.....	Quinto	Las Animas	Fall of rock
Feb. 19	See report on the Maitland explosion.							
Mar. 7	James Unteriner	Italian	Cager	29	Single	Beacon	Fremont	Falling down shaft
Mar. 13	Frank Needs	English	Miner	29	Single	Williamsville	El Paso	Fall of coal
Mar. 13	Arthur Little	American	Car gatherer	19	Single	Broadhead	Las Animas	Fall of coal
Mar. 23	Jno. Larochi	French	Miner	40	Married	Rex No. 2	Boulder	Fall of coal
Mar. 31	Samuel Abernathy	American	Assist. foreman	31	Married	Simpson	Boulder	Fall of rock
Apr. 19	Elt. Rizzi	Tyrolese	Miner	19	Single	Engle	Las Animas	Gas explosion
Apr. 22	See report on the Cuatro explosion.							
Apr. 24	Joe Menagotte	Tyrolese	Miner	20	Single	Sopris	Las Animas	Fall of roof
Apr. 26	Mat Bunton	Scotch	Miner	40	Single	Bowen	Las Animas	Fall of rock

May 9	Joe Rollitto	Italian	Miner	17	Single	Keystone	Garfield	Fall of drawslate
May 14	Geo. Pecarai	Italian	Miner	40	Married	Berwind	Las Animas	Fall of top coal
June 1	Tom Hunter	American	Miner	34	Married	Maitland	Huerfano	Fall of drawslate
June 11	Euracto Amidie	Italian	Miner	33	Married	Delagua	Las Animas	Fall of coal
June 30	Lot Sabo	Hungarian	Miner	23	Married	Engle	Las Animas	Fall of roof
July 9	Monte Hamilton	Hungarian	Miner	23	Single	Primero	Las Animas	Fall of coal
July 11	Pete Sam	Italian	Driver	21	Single	Delagua	Las Animas	Fall of roof
July 12	Martin Baide	Austrian	Miner	20	Single	Leyden	Jefferson	Struck by a derailed car
July 16	John Carcich	Slavonian	Miner	36	Married	Tobasco	Las Animas	Explosion of firedamp
July 18	Mont Hamber	Hungarian	Miner	23	Single	Primero	Las Animas	Electrocuted by a trolley wire
July 23	Joseph Odderzzi	Austrian	Miner	42	Married	Rouse	Huerfano	Fall of roof
July 24	Mike Kika	Slavonian	Miner	26	Single	Pryor	Huerfano	Fall of drawslate
July 28	Wm. Bennett	English	Miner	45	Married	Green Canon	Las Animas	Fall of rock
Aug. 1	Anton Tomsic	Austrian	Miner	37	.....	Primero	Las Animas	Fall of drawslate
Aug. 1	Jno. Link	Polander	Miner	33	Married	Toltec	Huerfano	Fall of coal and rock
Aug. 4	Y. Makoyne	Japanese	Miner	30	Single	Champion	Huerfano	Fall of drawslate
Aug. 6	Hugo Clark	Scotch	Miner	23	Single	Champion	Huerfano	Fall of roof
Aug. 27	Reese Thomas	American	Company man	20	Single	Beacon	Fremont	Premature blast
Aug. 29	Tony Markantonio	Italian	Contractor	31	Married	Primero	Las Animas	Fall of slate
Sept. 19	Guiseppi Donato	Italian	Miner	32	Married	Chandler	Fremont	Premature blast
Sept. 26	Andrew Hardman	Scotch	Miner	24	Single	Toltec	Huerfano	Fall of rock
Oct. 10	Andrew Gulimino	Italian	Miner	41	Married	Porter	La Plata	Fall of drawslate
Oct. 31	Joe Guerri	Italian	Miner	35	Married	Delagua	Las Animas	Fall of coal

FATAL ACCIDENTS IN 1906—Concluded.

UNDERGROUND.

Date	Name of Person	Nationality	Occupation	Age	Single or Married	Name of Mine	County	Cause of Accident
Nov. 2	Frank Yob	Austrian	Boss of night shift	37	Married	Hastings	Las Animas	Premature blast
Nov. 4	Angelo Pretti	Italian	Miner	21	Single	Primero	Las Animas	Fall of coal
Nov. 7	Mike Fidel	German	Miner	45	Married	Hecla	Boulder	Fall of rock
Nov. 7	John Adams	Austrian	Fire boss	32	Married	Tercio	Las Animas	Fall of rock
Nov. 8	Andrew Jaramillo	Mexican	Driver	26	Single	Sopris	Las Animas	Falling off trip
Nov. 18	Olandro Cordova	Mexican	Miner	45	Married	Midway	Huerfano	Fall of roof
Dec. 1	Joe Featne	Italian	Miner	34	Married	Hastings	Las Animas	Fall of roof
Dec. 4	Carl Shostrum	Swede	Miner	26	Married	Matchless	Boulder	Injured by cage and loaded car
Dec. 6	Joe Ferindo	Italian	Miner	37	Single	Forbes No. 6	Las Animas	Fall of roof
Dec. 13	Carlo Martigua	Italian	Miner	23	Single	Tobasco	Las Animas	Fall of roof
Dec. 21	Lee Ward	Colored	Driver	30	Single	Delagua	Las Animas	Fall of roof
Dec. 21	Wm. Figinshin	French	Miner	54	Married	Primero	Las Animas	Fall of coal and rock
Dec. 21	John Juas	Hungarian	Miner	26	Single	Pinon No. 3	Huerfano	Fall of roof
Dec. 24	Francisco Lopez	Mexican	Miner	..	Single	Broadhead	Las Animas	Fall of roof

SURFACE.

May 1	Tonny Chiggi	Italian	Car coupler	23	Single	Ludlow	Las Animas	Struck by coal flying off a run-away trip
July 6	David Logan	Scotch	Weigh boss	78	Married	City	La Plata	Struck by run-away trip

THE MAITLAND EXPLOSION.

A gas explosion occurred in the fourth west workings of the Sunshine district of the Maitland mine, about 9 o'clock a. m., February 19, 1906, the same resulting in the death of fourteen men, whose names, occupations, etc., are given in the list below:

Name of Person	Nationality	Occupation	Age	Married or single
John Titters	American	Miner	26	Single
F. Beam	American	Miner	28	Single
Wm. Moran	American	Miner	22	Single
B. Lovera	Italian	Miner	37	Single
A. Zanatti	Italian	Miner	43	Single
K. Koster	Italian	Miner	28	Married
Jno. Koster	Italian	Miner	33	Single
F. Nizzi Brothers	Italian	Miner	35	Single
J. Nizzi		Miner	28	Single
Tony Ari	Italian	Miner	29	Single
P. Divizio	Italian	Driver	19	Single
Fred Zenna	German	Miner	31	Married
Archie Miller	Scotch	Fire-boss	33	Married
N. Jacavak	Slav	Miner	45	Single

Ten of the victims died from suffocation, due to "after damp," and the other four from the combined effects of after damp and burns inflicted upon their faces and hands by the heat generated by the explosion of the fire damp.

The mine is located about four miles northwest of Walsenburg, the county seat of Huerfano county, and on a branch line of the Denver & Rio Grande Railroad. It is operated by the Victor Fuel Company. W. J. Murray, general superintendent; Harry Elliott, local superintendent, and Thomas Ash, mine foreman, are the managing officials of the mine.

The Maitland and Sunshine slopes are situated about a half mile apart, and were originally opened and operated by two independent parties. Although developing the same veins, their respective workings were isolated from each other by a sixty-foot dyke of eruptive material. Soon after the Victor Fuel Company became possessor of the Sunshine property, a tunnel was driven through the "dyke" from the terminus of the Maitland third east entry; thus the two mines were connected, and since then the entire product of the Sunshine has been hauled out through the Maitland slope. There are two veins of coal being developed, geologically separated by fourteen feet of arenaceous shale, the lower vein having a thickness varying from five to five and a half feet; the other, not quite as uniform in thickness, and worked as an auxiliary to the former, varies from two and a half to three and

a half feet, overlaid by an immense stratum of hard, resistive sand rock. The slopes are driven in the bottom seam in a southwesterly course, and nearly in line with the dip of the measures, which approximate five degrees, and have reached a distance of 3,000 feet from the entrance, which is the outcrop of the coal. The lower seam, which is first mined of the two, is worked systematically on the double entry room and pillar method. Here a series of rooms are driven to their destination and the pillars extracted; then the roof falls, usually to the sand rock immediately overlying the upper seam, leaving its bed of coal lying practically loose upon the surface of the fallen shale. If the superincumbent sand rock remains intact, a slant (incline) roadway is then constructed through the brow of the fallen debris, and the coal of the top vein is thus won.

Ventilation of both districts is effected by a twenty-foot force fan, located at the mouth of the main air course to Maitland. At a normal speed of eighty revolutions, the fan produces a total quantity of 40,000 cubic feet per minute. This main air course is driven in the upper seam for a distance of about one-third of a mile, at which point the principal air volume is divided in two—one division of the current (19,500 cubic feet per minute), being conducted through the said third east entry, now used only as electric haulage way and air course into the Sunshine workings, whence, after completing its circuit, it escapes in a diverging manner through the worked out parts of the Sunshine and the workings of the Pictou mine, a property adjoining. The other portion of the main current traverses the Maitland, returning up the latter's slope. All the present workings of the Sunshine are embraced within the section of the slope lying to the dip of the said connecting tunnel, and are confined to the third and fourth west fifth and sixth east entries, and the total number of men employed was 45. Dividing the 19,500 cubic feet of air by this number, we find that the quantity entering exceeded 400 cubic feet per man per minute.

It happened that on the day the accident occurred I was making a general inspection of the Baum-Saunders mine, seven miles out from Fort Lupton. The camp being new, communication with other points by wire or telephone had not yet been established; therefore, I could not be notified of the occurrence until I arrived at home at 6:30 p. m., although the office was informed of the fact early in the day by the Victor Fuel Company. I took the night train for Pueblo, so as to be in readiness for the first morning train to Maitland, arriving there about 11 a. m., and was at once informed that all the bodies had been recovered, the last one at 11:45 p. m. the same day of the accident.

The fourth west entry and its eleven tributary rooms, the seat of the catastrophe, were all retreating with the stumps and pillars. The total length of the entry, whose destination was determined by its contact with coked coal adjacent to the dyke.

was 400 feet, and the room lengths varied from 50 to 220 feet, conforming to the irregularity due to the metamorphosed condition caused by the dyke. Extraction of the pillars of the two inner rooms and the entry stumps to No. 9 had already been completed, and the pillars of the outer rooms were back from forty to fifty feet from their terminating line, which was the chain pillar of the third west air course.

In this excavated area, at the head of rooms Nos. 3, 4 and 5, the roof had fallen in irregularly across the faces, and longitudinally with the roadways for a distance of 20 to 30 feet, but leaving an open space of 20 feet or more between the outer edge of the falls and the working faces of the pillars. These caves were of varying heights, from a few feet to probably the whole thickness (14 feet) of the intervening shale between the two seams, but the exact height to which the heavier part of the falls reached could not be accurately determined, because at every accessible point where an examination could be made I found that at a height of 10 to 12 feet the fallen ground formed a close contact with the solid sides, and practically filling the cavity and making an investigation higher up impossible.

I entered the mine soon after my arrival, accompanied by Supt. Elliott and other employes. At this time the stoppings that were blown out and the damaged door at the mouth of the entry had not yet been replaced, excepting by crude devices, set up temporarily, and consequently the ventilation was impaired and seriously disarranged, the current short circuiting before reaching the fourth west workings. Yet the workings were perfectly clear of all after damp, and I was able to pass with safety lamps along all the pillars' faces. I found explosive gas (fire damp) at the heads of rooms 3, 4 and 5. In the former two the gas only extended a short distance back from the falls, but in No. 5 it was found close to the pillar in a cavity in the roof.

I inspected the mine again on March 1, and, although the work of rebuilding stoppings, etc., was not yet completed, the gas had at this time receded considerably and could be found only along the edge of the falls. On the 8th of March I was notified by Supt. Elliott that the ventilation had been restored to its normal condition in the affected district, and I again visited the scene and found that the gas had disappeared from all the places excepting at the top of the fall at the head of room No. 5. Here a small accumulation still existed at a point where the air current could not reach effectively, but since then a cross cut has been driven through the chain pillar at the head of the room by the use of which the current has been brought to play directly upon the gas until the last vestige disappeared.

There were two fire bosses employed at the mine, each examining his own district every morning before the other employes would enter. Andy Miller, fire-boss, Maitland district, a brother of the deceased fire-boss of the Sunshine, upon being questioned as to his knowledge of the conditions in the Sunshine

previous to the explosion, stated that at 6 a. m. the day of the disaster he and Archie met as usual, after making their rounds, at the third east double parting, Maitland, and in talking of the condition of their respective districts Archie said his "route was all clear excepting a little gas at the top of a cave in the fourth west." This testimony was verified by the deceased's report in the daily report book, in which he had recorded, "Some gas in No. 5, 4, W. SS."

From the small amount of damage done to the mine, it is evident that the explosion was of a very mild nature. Its effects, to any appreciable degree, did not extend up the slope and parallel air-course beyond the mouth of the fifth west entry, a distance of about 600 feet from the initial point. Within this distance nearly all the cross-cut stoppings were blown out, one over-cast torn down, and in all there were three falls of roof where timber had been blown out, aggregating twenty pit-cars of rock. The other entries not the least disturbed.

Of the fourteen killed only four were burned, viz.: Miller, fire-boss; Divizio, driver; Titters and Moran, miners, whose bodies were found in room 4, which was occupied by the latter two. According to Dr. McGuire's testimony, even their burns would not have proven fatal without the aid of the after damp. The other nine men who worked in the pillars on both sides of room No. 4 were found on the double parting at the mouth of the west fourth entry, all of whom died from suffocation only.

B. Lovera was working in the second room of the sixth east entry, and while trying to make his escape up the slope immediately after the explosion, he fell at said wrecked over-cast, and although soon rescued, he died in two hours after reaching the surface from the effects of inhalation of after damp.

Archie Miller served seven months as fire-boss at this mine, and had held a similar position for five years at another mine previous to beginning here. He held second and first class certificates, awarded him after standing rigid examinations, proving his ability to act in such capacity; therefore the man's competency to fill this position can not be questioned.

In spite of the weakness of the force of the explosion and the limited area covered by the flame, as is evidenced from the fact that those in the adjoining pillars, although working so close to each other in the same open space, were not burned. Yet it can be clearly seen that it was of sufficient magnitude to prove beyond a doubt that the accumulation of gas at the time it exploded exceeded the volume found by the fire-boss when making his morning examination. The amount of gas found by him being small and situated at the top of the cave, a rather remote point from the nearest working face, he undoubtedly believed that it was perfectly safe for the men to work and that no unexpected danger would develop. The men had worked two hours before it occurred, which shows that the faces were

clear when the shift started, hence the direct cause of how the increased accumulation came about can only be conjectured. If the air current had been cut off, or even reduced, we would naturally attribute it to such, but facts, as brought out by the evidence obtained through different sources, proved that the ventilation was at normality. There was no powder used in that particular section, and I did not discover the remotest evidence to indicate that dust took any active part in the explosion. Therefore, it can only be attributed to a sudden inflow of gas brought about by the squeeze of the superincumbent strata opening up fresh pores and thus exposing new feeders, and it is possible that the rapidity of transpiration of the gas was also augmented by a simultaneous fall of barometrical pressure.

While the cause of the explosion can not be charged to any negligence on the part of the officials, yet the occurrence teaches us that when pillars are being drawn under conditions so susceptible to a sudden inflow of gas from roof caves, and this occurring only locally and no danger for the same to reach any other part of the workings, safety lamps should be used exclusively in such particular districts.

JOHN D. JONES.

VERDICT OF JURY.

"That the above named men came to their death at Maitland mine at about 9 a. m., February 19, 1906. We furthermore find that the above named men came to their death by the suffocation caused by an explosion of gas in the fourth west Sunshine entry in No. 4 or 5 room of the Maitland mine. We, the jury, find, according to the evidence produced before us, that the death of the above named men was an unavoidable accident, and every known precaution which miners could take was taken to avoid the same.

"(Signed)

"E. L. TROUNSTINE,
Foreman.
"A. B. ONEIL,
"ROBERT YOUNG,
"RICHARD WEIN,
"VICTOR SANDOVAL,
"CARPIO ARCHULETO.
"S. JULIAN LAMME,
"Coroner of Huerfano County."

THE CUATRO EXPLOSION.

An explosion of "fire damp" occurred in the second north opening of the Cuatro mine at 10:25 a. m. (Sunday), April 22, 1906, and caused the deaths of nineteen persons.

LIST OF DEAD.

Name of person	Nationality	Occupation	Age	Single or Married
Frank Lisyak	Slav	Miner	..	Married
John Wrabic	Slav	Miner	41	Married
Matt Ceroli	Slav	Miner	39	Married
Frank Smreka	Slav	Miner	30	Married
Albin Sulc	Slav	Miner	33	Married
Mike Coraz	Slav	Miner	38	Single
V. O. Manley	American	Driver	27	Married
William Reese	American	Fire-Boss	32	Married
Ernest Delaney	French	Miner	18	Single
Charles Delaney	French	Visiting Father	8	.....
Fred Delaney	French	Miner	48	Married
Joe Depasse	French	Miner	28	Married
Paul Amichaux, Jr.	French	Miner	18	Single
Paul Amichaux	French	Miner	52	Married
Louis Torrosini	Italian	Miner	33	Single
David Manapace	Italian	Miner	25	Single
Pete Faure	Italian	Moving McGinties	29	Single
E. Manzuno	Japanese	Miner	26	Single
K. Kome	Japanese	Miner	38	Single

LOCATION, ETC.

The mine is located near the terminus of the Colorado & Wyoming Railroad, three miles west of Tercio, and thirty-four miles west of Trinidad, Las Animas county. It is owned and operated by the Colorado Fuel & Iron Co. The plant contains five independent openings, four drifts and one slope, all situated near the bottom of the narrow canyon and having their entrances within a radius of 150 feet of each other.

EXTENT OF OPENING AND METHOD OF MINING (WORKING).

The second north, the only opening considered from now on in this report, consists of two parallel entries, main and air course, which are in to a distance of nearly 4,000 feet, and 81 rooms. All the rooms are turned off the main entry, and are driven square up the pitch of 16 degrees, to a maximum distance of 500 feet. Operations are conducted on the "room and pillar" method. The vein has an average thickness of four and a half feet, and the coal is mined by blasting. All shots are fired by a "shot-lighter" when all the other employes are out of the mine and naked lights are used exclusively. There were forty-three men in the mine at the time of the accident.

VENTILATION, CONDITION OF MINE, ETC.

The ventilation is effected by means of a furnace which is, under ordinary conditions, capable of producing 10,000 cubic feet of air per minute, with a maximum capacity of about 12,000, and the air is conducted through the workings in one continuous current. During our previous inspections of the mine we never discovered the slightest trace of "fire damp" in any part of its workings, and the monthly and annual reports of the mine's officials, furnished regularly to the State Coal Mine Inspector's Department, does not contain record of any explosive gas having been found by them. Yet, as a precautionary measure, the mine is, and has been ever since its commencement, examined every morning by a fire-boss, whose daily report, which is kept at the mine office as per requirements of section 19 of the mining law, also showed that the mine was free from gas to date. It is the practice of the fire-boss to examine the old workings once each week, and the deceased "fire-boss" record book showed that he had made the usual weekly examination the day previous to the accident, and had reported as follows: "April 21st, 7 a. m., all goves examined and clear; air courses in fair condition." Signed, Wm. Reese.

Herbert Tyber, miner, who was working in the main entry, upon being questioned, testified that he filled the capacity of fire-boss in the mine for two years, from June, 1903 to 1905, and that he never detected any explosive gas in the mine during the entire period, nor any time after. I questioned several others who had worked in the mine, and all stated that they never had seen any indication of gas to exist there. Therefore, until the time of the explosion naturally the mine was regarded absolutely "non-gaseous."

DAMAGE TO MINE.

The displacement of one set of timber and all the cross-cut stoppings between the main entry and air course, from mouth to No. 29 room, included all the damage done to the mine.

RESCUING, LOCATION AND CONDITION OF VICTIMS.

Soon after the explosion occurred, a rescuing party, headed by Superintendent McDermott, entered through the main entry. The air was heavily contaminated with "fire damp," and they rebuilt temporary stoppings to restore the ventilating current as they advanced. Wm. Reese, fire-boss, E. Manzuno, miner, who worked in room 49, Richard Bickerton, foreman, and Claude Amichaux, driver, were found lying together on the entry between rooms 6 and 7. They were still alive, but unconscious, and it was after being removed to the surface that the first mentioned above died. Bickerton and Amichaux revived through the assistance of artificial respiration, and have since recovered from the effects of the burns inflicted upon their hands and faces. Evidence has shown that the other victims were all located be-

yond the extreme limit covered by the explosion when it occurred, and that they died from suffocation afterwards while making an effort to escape to the outside through the after damp filled passages. Albin Sulk, Mike Coraz and Joe Depasse were found on the main entry between rooms 17 and 28, in a state of unconsciousness. They were hastened to the surface, and artificial respiration was immediately applied, but to no avail. These three and a Japanese by the name of Y. Haro worked in room 29, and, according to Haro's statement, when they felt the shock caused by the explosion, all rushed towards the entry. Upon discovering that the passage to the outside was filled with after damp. Haro remarked to the others that "there was too much smoke," and he returned to work, but the other three rushed outward along the entry and were overcome at the points designated above. Haro walked out safely in about two hours afterwards. The bodies of the other fourteen victims were found in the main air course from a point opposite rooms 17 and 29. All these men were working from room No. 50 in, and suffocated while trying to pass through the air course. Victor Amichaux, who fell with the rest of the victims in the air course, recovered.

OUR INVESTIGATION AND CAUSE OF THE ACCIDENT

In company of J. D. Griffiths, deputy inspector, I arrived at the scene of the accident on the morning of the 24th. The only two men who were directly in the path of the explosion, that survived, namely Bickerton and Amichaux, at this time had gone to the company's hospital at Pueblo for treatment for their burns. Therefore, no available witness was at hand to testify what had been the direct cause of the explosion. Soon after our arrival we proceeded into the mine and were accompanied by Messrs. J. T. Kebler, general manager, Robert O'Neil, division superintendent, and Wm. McDermott, local superintendent. The condition along the main entry gave conclusive evidence from blacked props, etc., that the force of the explosion was confined exclusively to the territory lying between the entrance and room 26. Room No. 29 was the outer place in operation the day of the explosion, and all rooms from No. 29 out, excepting Nos. 7 and 8, both of which were idle at the time, were worked out and abandoned. Knowing that there were no shots fired, and that no one was working directly in the affected district, we naturally concluded that the explosive gas had unexpectedly accumulated in the abandoned district, and that the same had worked its way to the entry and there was ignited by one of the victims while passing along the entry. With this first supposition, we started at the outside rooms and made a thorough examination of the old workings as we advanced. When we reached room 27, the direct cause of the explosion was distinctly disclosed. Here a body of fire damp stood within 35 feet of the entry. It was discovered by Superintendent McDermott, who happened to be the first to enter the place. After this discovery we made a close examination of the props at the mouth of

room 27, and found the bark on them to be heavily charred, indicating that the heat had been very intense at this point. Room 27 is located near the center of a double parting, extending from No. 25 to 28; it is 55 feet in length and 18 feet wide. Between rooms 28 and 29 a fault cuts the seam at such an angle that the last few rooms on its outside were cut shorter than the usual length, and each had been driven to the fault.

In room 27 was a fall of roof which extended from a point 35 feet from the entrance to the face, a distance of about 20 feet, and throughout the width of the room. It was in this space the gas accumulated. We made a thorough examination of all the workings, and it was only in 27 that we found explosive gas. The room adjacent, No. 26, is about 50 feet longer than 27, driven against the same fault and having a larger fall at its face, but it was perfectly free from gas. The fall of the roof at the head of room 27 had opened a 2 foot vein of coal from 6 to 8 feet above the main seam, and it is very probable that the gas issued from this top vein.

When the above investigation was made, we knew that the four men found between rooms 6 and 7 were the only men within the direct embrace of the effective force of the explosion, and Bickerton and Amichaux, two of said four men, were, as stated above, at the hospital. Both have recovered from their injuries, and are now back at work. Since their return I made another investigation for the purpose of securing, if possible, information how and by whom the gas was ignited. Mine Boss Bickerton stated that "he and Wm. Reese, fire boss, were standing at the mouth of room 27, both unaware of the fact that gas existed, and that Reese entered the room with his naked light, and thus the gas ignited and the explosion followed. They both hurried back together over the entry, and when they reached the point given above, they became exhausted and fell. Amichaux was on his way out with a loaded trip, and Manzuno was riding with him."

The quantity of gas which was exploded being comparatively small, it was quite impossible for the volume which exploded to have made the volume of "after damp" which was found in the mine after the explosion.

The entry from 27 out to the mouth of the mine was dry, but free from excessive accumulation of dust, and from the statements of parties examined, was occasionally sprinkled for the purpose of laying the dust generating from the continuous grinding of the cars, and otherwise upon pieces of crumbling slate from the roof as well as coal particles. From 27 in, the entry was wet. Some of the props along the entry from 27 out were slightly coated with dust cokings, and I can account for the large volume of "fire damp" in no other way than from the fact that the gas explosion was accompanied by a slight explosion of coal dust along the course of the entry.

Great credit is due to John Mazzini, track layer, for the presence of mind and courage he displayed during the awful period

when he and many others were shut off by the fire damp. He stood on the entry at a point inside of where the after damp reached, and advised the men to stay inside and that they would be rescued in time. Had the fourteen men who died in the air course and the three from 29 remained inside, they, too, would have been saved, for the after damp was gradually forced into the air course and out as the rescuing party rebuilt the "stoppings." The little boy, Charley Delaney, who was visiting the mine with his father, Fred Delaney, was among those who died in the air course. He was not employed in the mine, and only unfortunate enough to visit it on this unlucky day.

Attached is a copy of the coroner's verdict, as rendered by the jury.

JOHN D. JONES,

VERDICT OF JURY.

An inquisition holden at Cuatro mine, in Las Animas county, State of Colorado, on the 24th day of April, A. D. 1906, before E. W. Coney, acting coroner of said county, upon the body of Frank Lisyak and eighteen others, there lying dead, by the jurors whose names are hereto subscribed; said jurors, upon their oaths, do say that the cause of the explosion was gas. Deaths due to suffocation caused by after damp. No criminal negligence on part of officials or employes of same.

In testimony whereof, the said jurors have hereunto set their hands, the day and year aforesaid.

W. H. WITNACH,
BURT MILLER,
HARRY BIRD,
SAM WILLIAMS,
JOE SOAROTTO,
WM. TYLER,
Jurors.

Attest:

JAMES G. ESPY,
Coroner of Las Animas County.

ESTIMATED AREA OF COLORADO COAL FIELDS. U. S. MINERAL RESOURCES.

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
South Platte Field	6,800
North Park Field	300
South Park, Canon City and Tongue Mesa Districts	100
Dakota Measures (Southwestern Colorado)	300
Total	18,100

MAP OF YAMPA COAL FIELD, ROUTT COUNTY, COLO.

A. Shuster mine, Oak Creek.
B. Entry in Trout Creek Canyon
C. Hutchinson mine, Middle Creek
D. McrCoskey mine, Yampa River
E. Crawford entry on 11-foot seam of anthracite.
F. Crawford entry on 6-foot seam.
G. Crawford entry on 11-foot seam of bituminous.
H. Entry on Miller Gulch.
K. Old mine on Wadge seam, Yampa River.
L. Gartman entry, Butcherknife Creek.
M. Entry on 11-foot seam in Sage Creek Canyon.
N. Entry on 6-foot seam in Sage Creek Canyon.
O. Recent entry on Wadge seam, Yampa River.
P. Mine on Dry Creek.
Q. Green seam, Hayden Gulch.
R. Wise and Ratcliff banks, Williams Fork.
S. Coal bank near Big Bottom Ranch, Yampa River.
T. Kimberly bank, Craig
U. Walker bank, Craig.
V. Entry of Egeria Coal Company, Quaker Mountain
W. James mine, Oak Creek
X. Electric Light Company mine, Oak Creek.
Y. Hitchins mine, near Pool.
Z. Seymour mine, Dry Fork of Little Bear.

Total	18,100

ESTIMATED QUANTITY OF AVAILABLE COAL IN COLORADO FIELDS.

Location	Accessible Area Sq. Miles	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
South Platte 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	2,913	45,197,100,000
Total net tonnage, or 75 per cent. of gross estimate		33,897,800,000

THE YAMPA COAL FIELD, ROUTT COUNTY, COLORADO.*

By N. M. Fenneman and Hoyt S. Gale.

LOCATION.

The existence of important coal resources in northwestern Colorado has been known for many years. The region of greatest interest is in the eastern half of Routt county, lying in the upper valley of Yampa river. The area covered by this survey of the field is approximately 1,200 square miles, and this is practically the extent of the Yampa coal field. It lies at the western foot of the Park range of the Rocky Mountains. On the north are the high peaks and ridges of the Elkhead Mountains. On the south the field is interrupted by an east-west anticlinal fold through Axial basin, supposed to be the eastward extension of the Uinta uplift, which merges into the White river plateau. To the west and northwest the coal bearing rocks extend to an undetermined distance, disappearing beneath formations of later age.

The coal field lies approximately midway between the Union Pacific Railroad on the north and the Denver & Rio Grande Railroad on the south. Steamboat Springs, the most prominent town of the district, is usually reached by stage from Wolcott, Colorado. The field is also reached by stage from Middle Park and Rifle, Colorado, and from Rawlins, Wyoming. A number of regular stage lines run through the field.

The prospect of a railroad through the center of the area has in recent years stimulated exploration and careful study. It seems almost certain that with more adequate transportation facilities the Yampa coal field will become an important factor in the supply of the western market. The coals are, for the most part, a good grade of bituminous, and anthracite of good quality is known to exist within a certain limited area.

*This paper is a preliminary report, to be followed later by one giving fuller details and a more complete map.

The field centers about a broad area of rolling country, of characteristically smooth slopes, although at places showing considerable relief. This is bounded by a sharply dissected rim of sandstone ridges, rising to 1,200 or 1,500 feet above the drainage level. Yampa river cuts across the field in a westerly course, flowing through broad, open bottom lands, where the course lies over the soft rocks of the prairie land and through canons where it has cut across the sandstone ridges.

STRUCTURE.

This coal field, as a whole, is a well defined structural unit. It is the extreme southeastern point of a huge synclinal basin of the coal bearing rocks, the axis of which passes almost directly through the towns of Yampa and Hayden. Since the basin, as a whole, plunges to the northwest, the beds along the axis dip in that direction. Following this axis from the extreme point of the fold, one passes over successively higher and higher members of the coal bearing series until, in Twenty-mile Park, the uppermost group of coal beds is entered. These in turn are overlain by dark clay shale, distinct in character from the rocks of the coal bearing formation.

The major syncline just described is interrupted by a number of cross folds or wrinkles. The most prominent of these minor folds is an anticline, the axis of which follows the crests of the high ridges on the west side of Twenty-mile Park, and crosses Yampa river at the mouth of Tow canon. On the north side of the river the axis bends a little west of north, disappearing into an area of igneous eruptives in the direction of Wolf mountain. This cross buckle of the strata lies approximately at right angles to the major axis and cuts off a structural basin on the southeast or Yampa end of the field. The center of this subordinate basin is marked by the open prairie land of Twenty-mile Park.

The rest of the field is a broadly opened syncline, whose outer rim is made up of ridges formed by the massive sandstones of the coal bearing series. Within this rim, which is a marked topographic feature, is a belt of open prairie and valley land eroded on the soft black shale that overlies the coal beds. These in turn are replaced in the center of the syncline north and west of the town of Hayden by beds of the overlying Laramie formation. The latter dip away to the northwest, until they are covered by the overlying Tertiary rocks, which are supposed to cover all of the region along the Colorado and Wyoming line.

West of Twenty-mile Park the sandstone ridges swing to the west and form a low range of mountains on the north side of Williams Fork, called the Williams Fork Mountains. The sharply dissected southern slope of these mountains exposes the upturned edges of the whole coal series for over twenty miles. The coal beds dip to the north, passing under the barren shale which forms the valley of Yampa river.

The rim of sandstone ridges bounds the east side of Hayden valley from near Twenty-mile Park to Wolf mountain and Pilot Knob of the Anthracite range. North of Pilot Knob the sandstones are much broken by intrusions of sheets and dikes of basaltic lava, and consequently the rim of the basin is not well marked, but the coal beds have been traced in this direction as far as the flanks of Sand mountain. All along this eastern rim of the field the rocks have a general westerly dip, also passing under the barren shale of the valley of Yampa river. In all probability the coals of the eastern rim extend beneath Hayden valley, and are continuous with the coal beds showing in the Williams Fork Mountains.

STRATIGRAPHY.

On the eastern side of the great syncline strata as old as Triassic lie tilted against the Archean core of the Park range. To the west the Dakota, Benton and Niobrara are crossed, each in its turn dipping under the next higher formation. Above these, at a distance of several miles from the Archean core, is a thick mass of coal bearing strata. These rocks have been previously considered as of Laramie age, but fossils collected from them during the past season's work were sufficient to determine definitely that they belong to the Montana group of the Cretaceous. This group is the equivalent of the Pierre and Fox Hills formations of other fields, although this subdivision can not well be applied here.

Stratigraphic sections in different parts of the field do not agree in their minor details, but a few of the dominant members of the series are very persistent throughout the area and serve as useful horizon markers. The chief of these are some of the massive sandstone beds and the three groups of coal seams. The following is a generalized section, compiled from many such sections measured in various parts of the region:

GENERALIZED SECTION OF THE COAL-BEARING SERIES.

	Feet.
Laramie:	
Alternating soft sandstone and shale, with frequent lignite seams	900+
Montana:	
(1) Dark-colored clay shale, with calcareous seams, estimated as	1,000-2,000
(2) Coal-bearing rocks, consisting of—	
(a) Alternating sandstone (at places massive) and shale containing the upper group of coals	400
(b) A persistent massive white sandstone	50- 150
(c) Alternating sandstone and shale beds containing in their lower half the middle group of coals	1,000
(d) A persistent massive white sandstone	50- 150
(e) Alternating sandstone and shale beds containing near their middle the lower group of coals	800
(f) Alternating sandstone and shale beds, massive sandstone predominating, with a few small coal seams near its base	800
(3) Dark-colored clay shale	1,000-1,500
	6,000-7,700

Each group of coal seams ranges through a vertical distance of from 200 to 400 feet, and the several groups are separated by from 500 to 1,000 feet of barren shale and sandstone. The number and thickness of coal beds constituting each group vary from place to place. Usually there are in each group at least three seams of workable thickness and a number of smaller seams. Single beds of coal occur up to a thickness of about twenty feet.

At or near the base of each coal group are found conspicuous sandstone beds. These are characterisically massive and white, and frequently more than 100 feet thick. While generally ridge or ledge makers, the exposed surfaces readily weather to a friable condition. The broad exposures are frequently marked by cracks, making polygonal figures a foot or more in diameter. Great concretions and stains of iron oxide are also common.

Below the three coal groups is a great series of very massive sandstone beds, sometimes designated as the "barren sandstones." Where exposed, these are usually prominent as a series of hogbacks. As stated in the generalized section, a few small seams of coal are found low down in this series.

The Laramie, overlying the Montana, is composed of alternating sandstones and clay shales. At least 900 feet of such sediments are embraced in the steep scarp on the north bank of Yampa river at Hayden. In this bluff indications of lignite were found at twenty horizons, distributed somewhat regularly throughout the upper two-thirds of this thickness.

COAL.

For convenience in describing the various mines and outcrops the field has been divided into four main structural districts, as follows: (1) Twenty-mile basin, including the extreme southeast point of the syncline and bounded on the northwest by the cross anticlinal fold mentioned on a previous page; (2) Williams Fork Mountains, including the southern rim of the main basin west of the cross anticline and Twenty-Mile park, and the outcrops in Yampa valley in the vicinity of Craig; (3) Wolf creek and Anthracite range, including the coal beds exposed on the eastern rim of the main basin from Yampa river as far north as the coals have been traced; (4) Lower Elkhead and Fortification creeks, including the lignite coals of the Laramie formation and lying in the structural center of the main basin of the field.

TWENTY-MILE BASIN.

This structural basin includes the coal beds exposed on Oak, Trout, Middle and Fish creeks, and a small area on and near Yampa river, about two miles west of Pool postoffice. In this basin all the coal-bearing rocks dip in general toward its center, which is Twenty-Mile park, and thus they form a single structural basin. Each creek valley, however, forms a distinct district or commercial unit, for the developments in a single valley are in the main subject to similar conditions of accessibility and con-

venience to market, and these conditions are usually different from those of adjacent alleys in the same structural basin.

Oak Creek District.—Coal seams outcrop along the upper valley of Oak creek for a distance of at least nine miles. The valley of this creek practically outlines the extreme southeastern limit of the coal field. Coal beds occur in the high bluff north of Pinnacle postoffice and probably they are continuous along the bluff on the north side of the creek as far as the Yampa and Eddy road. By the side of this road in a small tributary valley of Oak creek there are a number of openings, which are generally known as the James mine (W on map, Pl. VI). There is some doubt as to the position of the beds opened in these mines, but they probably belong to the lower coal group. Openings have been made on three seams, separated by intervals of about thirty-five feet each. The coal dips about 10° NW. The principal mine is on the uppermost bed that is exposed. An entry has been driven in on the coal bed for some distance, and considerable coal has been mined for local use and to supply the growing town of Yampa. The mine was not in operation at the time it was visited, and a complete section could not be obtained. The exposed part of the bed is as follows:

SECTION OF UPPER COAL BED AT JAMES MINE.

Shale, dark.	Ft.	In.
Coal		5
Clay, white		1
Coal (base not reached)	7+	
	7	6+

The next or middle coal seam was not accessible, and consequently was not measured. An incomplete section of the lower seam, as shown in the principal opening at this point, is as follows:

SECTION OF LOWER COAL BED AT JAMES MINE.

	Ft.	In.
Coal, good, bright	3	2
Coal, dirty		3
Coal, flaky		10
Clay, white		½
Coal, good, bright (base not reached)	1	1½+
	5	5+

Farther down the creek a coal bed also belonging to the lower coal group is opened by the side of the road leading from Yampa to Eddy postoffice. This opening is generally known in the region as the Shuster mine (A). An entry has been driven in on the coal bed for several hundred feet, and a large amount of coal has been taken out for local use. At the time of the visit the coal was being hauled from this point to Steamboat Springs

for use in the electric-light plant. The section of the coal bed in this mine is as follows:

SECTION OF COAL BED IN SHUSTER MINE.

	Ft.	In.
Coal	3	3
Shale, carbonaceous	1	6
Coal	1	11
Clay		1
Coal	4	9½
	11	6½

The seam dips in general to the northwest, at an angle of about 20 degrees. A sample was taken at this mine for chemical analysis. It was obtained by making a cut across the face of the coal in one of the rooms of the mine, and it includes all of the two lower benches of the coal, exclusive of the clay parting.

ANALYSIS OF COAL (SAMPLE A) FROM SHUSTER MINE. a

[F. M. Stanton, Analyst.]

Moisture	8.85	
Volatile matter	36.06	
Fixed carbon	50.19	
Ash	4.90	
		100.00
Sulphur	1.51	
Loss of moisture on air drying	2.30	

Below the Shuster mine the coal beds of the lower group have been opened in a number of places along Oak creek, but the most important development has been at the point where the Oak creek leaves the coal field and turns east toward Yampa river. Here a great deal of mining has been done in the past. The only mine now operating at this point is one on the south side of the creek, owned and operated by the Steamboat Springs Electric Company (X). The coal is considerably crushed. At the time this mine was visited it was impossible to secure a detailed measurement, but the coal bed appears to be the same as that operated at the Shuster mine, and to have a similar thickness. Six coal seams show on the north side of the creek in a section about 230 feet thick. The sandstone and coal beds dip about 45 degrees west.

a Samples for analysis were taken in a uniform manner throughout the field. A face of the coal seam was first cut down so as to expose fresh coal. A channel was then cut across the whole seam, only that part which would be saved in actual mining or such as appeared to be good merchantable coal being saved for the sample, and all bony seams and partings being thrown out. This large sample was pulverized and quartered down to convenient size at the mine and there sealed in an air-tight galvanized-iron can. The analyses were made under the supervision of Prof. N. W. Lord, of the Ohio State University, at the laboratory of the United States Geological Survey coal-testing plant, St. Louis, Mo.

The middle coal group outcrops near the summit of the bluff on the west side of Oak creek, about 500 feet above the Shuster mine. The outcrop appears to be continuous from this point to Eddy postoffice, but only prospect pits were found, and these seemed to indicate that the coal beds are not so valuable as are those of the lower group in this locality.

Trout Creek Canon District.—A number of coal seams are exposed on upper Trout creek near the mouth of the canon, about six miles above Eddy postoffice. The seams are opened near the road that crosses from Oak creek, and they probably occur in the middle coal group. About three-fourths of a mile above this point another group of coal seams has been prospected. These probably belong to the lower group, which is thought to follow down Trout creek on the crests of the ridges in approximately horizontal position from Pinnacle postoffice to near the mouth of Trout creek canon, where this coal group suddenly dips below water level. On one of these seams of the lower group an entry has been driven in 40 feet, showing 6 feet 3 inches of coal (B). The coal was slightly weathered, but a sample cut across the face of the seam gave the following analysis:

ANALYSIS OF LOWER COAL (SAMPLE B) IN TROUT CREEK CANON.

[F. M. Stanton, Analyst.]

Moisture	8.59	
Volatile matter	33.85	
Fixed carbon	47.30	
Ash	10.26	
		100.00
Sulphur	1.50	
Loss of moisture on air drying	4.10	

Eddy District.—The middle and lower coal groups cross Trout creek in the vicinity of Eddy postoffice, and mines and prospects show that both groups carry workable coals. A coal bed of the lower group is opened at the Jones mine, on the north side of Trout creek, one and one-quarter miles below Eddy. The coal is nearly horizontal and shows the following section:

SECTION OF COAL BED AT JONES MINE.

	Ft.	In.
Coal	1+	
Clay		3
Coal	6+	
	7	3+

This coal group contains a number of thick beds, as shown by the section on the county road which crosses Trout creek two miles below Eddy.

The middle group of coals has been opened on the Hutchinson property on Middle creek (C), just above the crossing of the public road west of Eddy. The principal seam shows a thickness of nine feet six inches of clear coal in the mine near Mrs. Hutchinson's house. A sample for analysis was taken at a new opening a few rods down the creek. This sample was obtained by making a cut across the lower part of the seam and represents a thickness of 5 feet of coal. The analysis is as follows:

ANALYSIS OF COAL (SAMPLE C) FROM HUTCHINSON MINE.

[F. M. Stanton, Analyst.]

Moisture	12.50	
Volatile matter	35.15	
Fixed carbon	46.91	
Ash	5.44	
		100.00
Sulphur	.42	
Loss of moisture on air drying	6.20	

Another seam, 25 feet below the Hutchinson seam, has been opened a little farther down the creek, and to judge from the appearance of the dump heap, considerable coal has been taken from it. This bed shows a thickness of 6 feet 2 inches of clear coal. There are many other openings and prospects in this vicinity, but those given are representative of the larger seams.

Pool District.—At the mouth of Trout creek Twenty-mile basin extends to the north in the form of a narrow syncline, and the coals of the middle and lower groups cross Yampa river. The situation will probably be best understood by reference to the map. Seams of both groups have been opened in this district. A lower seam of the middle group is opened at the McCroskey mine (D), on the north side of the river, a little less than two miles west of Pool postoffice. At the time of visit this was the only mine being worked in the district. The coal is used for domestic purposes, and is hauled as far as Steamboat Springs. The mine is driven in 400 feet, and the following measurements were made:

SECTION OF COAL BED AT McCROSKEY MINE, ON YAMPA RIVER.

	Ft.	In.
Sandstone roof.		
Bony Coal	2 to 3	6
Coal, good	4	8
Coal, bony		6
Clay		3½
Coal, good	3	11
Coal, bony	1	
Sandstone floor.		
	10	6½

The following analysis was made from a sample representing all the good coal of this seam:

ANALYSIS OF COAL (SAMPLE D) FROM THE McCROSKEY MINE.

[F. M. Stanton, Analyst.]

Moisture	12.03	
Volatile matter	34.51	
Fixed carbon	42.79	
Ash	10.67	
		100.00
Sulphur	.47	
Loss of moisture on air drying	4.40	

This coal is one of several seams of this group showing in the face of the hill just north of the road. The amount of available coal at this point is, however, limited by the sharp tilting up of the point of the syncline a short distance north of this mine.

The lower coal group is well shown in the tilted sandstones along the stage road just east of Tow canon. Several of the seams have been burned in outcrop.

Coals of both the middle and lower groups have been opened south of the river. A seam of the lower group is opened at the old Brooks mine, situated in a gulch that opens into Trout creek from the southwest near its junction with Yampa river. This seam is slightly over five feet thick, and shows a face of solid, bright coal lying between massive beds of white sandstone. The middle group is developed in an old opening known as the Hitchins mine (Y), one-half mile southwest of the Brooks mine, in the same gulch, and about 250 feet above the creek valley. This is a seam 10 or 11 feet thick. When visited the entrance was locked, and the roof in bad condition.

A small structural basin of coals of the lower group lies on the summit of the ridges a few miles northwest of Pool postoffice. These coals have been prospected by drifts in a number of places, and are reported to be of workable thickness, but the prospects were not visited. The basin is a comparatively small one.

The western side of Twenty-mile park is bounded by ridges of steeply upturned strata. Fish creek cuts through this wall in a sharp canon a short distance below Dunkley postoffice. In this canon the section of nearly the whole coal-bearing series is well exposed within a short distance. Seams of the lower and middle groups have been worked for local use. An old entry on a seam of the middle group measured 12 feet, more or less, of coal, overlying 8 feet of thin-bedded sandstone and shale. Under this is another seam of coal 3 feet thick. The dip is 56 degrees east.

The coals of the upper group are exposed in many places in Twenty-mile Park. The representation on the map of the outcrop

of this coal group is only approximate, for these coals lie above the more massive beds of sandstones of the coal-bearing series and are themselves covered by beds of soft and easily eroded shale. As both the upper coals and the overlying shale in large part occupy an approximately horizontal position, slight undulations of these beds may bring these coals to outcrop almost anywhere in the shale valleys and, on the other hand, may also carry the same coal seams to a considerable depth under the shale cover, without necessarily showing in the sagebrush prairie any surface indication of structure. This is true of the upper coal group throughout the field, with the exception of the few districts in which the coals are tilted at such high angles as to make their outcrop a fairly definite line. The inferior quality of the coal in some of these seams that have been opened is probably due to lack of sufficient cover to have afforded protection from atmospheric agencies. The probability is, however, that a large proportion of this coal group lies sufficiently buried to have preserved the coal from such deterioration. The seams most deeply buried are not the ones most readily opened in prospecting.

WILLIAMS FORK MOUNTAINS.

This general district includes all the coals on the south side of the main field and west of Twenty-mile basin. The coals are exposed in outcrop on the crest and flanks of Williams Fork Mountains, which constitute the divide between Williams Fork and Yampa River. This definition of the district includes the Sage Creek coals, although these extend in outcrop, following the Sage Creek anticline, considerably north of the general trend of the coal groups of this district. From Sage Creek westward the outcrop of the three coal groups approximately parallels the crest of the Williams Fork divide, but is complicated by cross folds near the junction of Yampa River and Williams Fork. The cross folds are repeated for eight or ten miles to the west of the area shown in the map (Pl. VI) and finally disappear beneath the overlying strata in the vicinity of Lay postoffice.

Sage Creek Canyon.—A little over five miles south of Hayden, Sage Creek emerges from a canyon eroded on the axis of a minor anticlinal fold. This fold, like that on the west of Twenty-mile Park, is not symmetrical, and has a steep dip on the east flank and a much lighter dip to the west. The three coal groups are exposed as indicated on the map. On the north slope a seam of the upper group has been opened and worked for the Hayden market. In the canyon two seams of the middle group have been opened by drifts and are now being worked for domestic use in and about Hayden. One of these seams (N) of the middle group measured six feet ten inches of clear coal, and a sample for analysis representing the whole face was taken at the breast of a 300-foot drift. This seam dips twenty-eight degrees NE. The analysis is as follows:

ANALYSIS OF COAL (SAMPLE N) FROM THE BARNES MINE.

[F. M. Stanton, Analyst.]

Moisture	11.23	
Volatile matter	37.07	
Fixed carbon	47.52	
Ash	4.18	
		100.00
Sulphur	1.60	
Loss of moisture on air drying	4.20	

About 75 feet below this seam, in the same group, is another seam (M) which measured 11 feet 5 inches. A sample of this coal, for analysis representative of the whole face, was also taken:

ANALYSIS OF 11-FOOT SEAM (SAMPLE M) IN SAGE CANYON.

[F. M. Stanton, Analyst.]

Moisture	11.03	
Volatile matter	35.85	
Fixed carbon	47.46	
Ash	5.66	
		100.00
Sulphur	.52	
Loss of moisture on air drying	2.70	

These openings are on the eastern or steep side of the anticline. About 1½ miles up the creek, on a small side gulch from the east, is a prospect on a seam of the lower group, showing about 10 feet of coal. This dips at an angle of 35° NE.

Dry Creek District.—The coals exposed along Dry creek are of the upper group and lie against the west flank of the Sage creek anticline. These coals have been opened at a number of places, and one entry (P) was being worked to supply the Hayden market at the time of visit. A sample of this seam, representing 7 feet 10 inches of solid coal that was being mined, was taken for analysis:

ANALYSIS OF COAL (SAMPLE P) FROM DRY CREEK.

[F. M. Stanton, Analyst.]

Moisture	15.74	
Volatile matter	33.37	
Fixed carbon	46.77	
Ash	4.12	
		100.00
Sulphur	.41	
Loss of moisture on air drying	9.20	

The whole section of the upper group as exposed in this vicinity was measured as follows:

SECTION OF UPPER COAL GROUP ON DRY CREEK.

Heavy white sandstone.	Ft.	In.
Shale	3	
Coal	3	
Parting		1
Coal (mined)	7	10
Shale	12+	
Coal	2	
Bone		8
Coal	2	
Sandstone	4	
Shale, sandy	4	
Coal	5	3
	43	10

From the Dry creek openings the road runs in a southerly direction across the Williams Fork divide and thence down Hayden gulch. On the north side of the summit the road follows the outcrop of the upper coal group for several miles. These coals have been largely burned at the outcrop, as have many of the seams outcroping to the south and west of this district. In such cases the coals are marked by banks of reddened shale and sandstone and often by clinkers.

Williams Fork Divide District.—On the south or Williams Fork side of the summit of the public road the trend of outcrop changes and all three coal groups turn across Hayden gulch, as is represented on the map. About one mile from the mouth of this gulch openings have been made on seams of the lower group, which have been worked by the settlers from Williams Fork. These workings are known as the Green and the Scott mines. The Scott mine exposes a seam of 9 feet 2 inches of good coal, overlain by 4 feet of shale. This was worked out in a large chamber, the roof of which was in a dangerous condition when visited. The Green seam (Q) was opened by an entry ending in a chamber and exposes a fine face of coal 10 feet thick. A sample from the Green seam, representative of the whole face as mined, shows the following analysis:

ANALYSIS OF COAL (SAMPLE Q) FROM THE GREEN SEAM, HAYDEN GULCH.

[F. M. Stanton, Analyst.]

Moisture	11.34	
Volatile matter	34.49	
Fixed carbon	49.57	
Ash	4.60	
		100.00
Sulphur	.50	
Loss of moisture on air drying	3.40	

From Hayden gulch the outcrops of the lower and middle coal groups extend westward on the south slope of Williams Fork divide. The coals have been prospected at many points along this belt, but nowhere have they been opened to any considerable extent. These outcrops probably represent a large quantity of workable coal, having a very uniform light dip to the north. The outcrops are accessible in many gulches that extend back from Williams Fork.

In the vicinity of Hamilton postoffice, on the south side of the river, some coals are exposed that are thought to belong to the lower group. These appear to be small outlying basins, a portion of the complication of folds lying between Williams Fork and Axial basin. The Kellog coal bank, 5 miles south and a little east of Hamilton, was visited, as were also a number of prospects on thick seams in the same locality. The opening on the Kellog bank is a drift 200 feet in and shows 15 feet of solid coal, with coal roof and coal floor.

Lower Yampa District.—Near the junction of Williams Fork and Yampa river a large number of prospect pits and drifts and several banks to supply the local demand have been opened. These are on seams of all three coal groups. Among these a number of prospect drifts, locally known as the Greeley group, have been opened in the canyon of Yampa river. The openings on this property were in bad condition, owing to caving, but exposed a number of thick seams of coal, representative of the lower coal group at this point. Approximate measurements show one seam of 5 feet 8 inches of solid coal, another of 7 feet of coal with a 6-inch bony parting near the top, and still another seam 11 to 13 feet thick.

The Wise and Ratcliff banks (R), on Williams Fork, near its mouth, are on seams of the middle coal group. The Wise bank shows 8 feet of coal, with a shale roof, but the actual thickness of the seam may be somewhat greater. The Ratcliff bank, on a school section, was being worked under lease at the time of visit and most of the coal was being hauled to Craig. The opening was driven in 400 feet, and measurements of the seam showed 10 feet 7 inches of coal without partings, of which, however, the lower 16 inches were not mined. The mine has been worked in large rooms and the roof has caved badly in places. It is timbered with long poles set about 3 feet apart and is fitted with a 1-ton car and a small, wooden frame tipple. A 4-foot seam is reported, lying about 50 feet below this seam, and both appear to overlie stratigraphically the seam of the Wise bank. The upper coal group is opened at the Joseph Haubrich bank, on Yampa river, just above the forks. The bank showed a thickness of 6 feet 4 inches of coal and has a shale roof. This coal lies just above the massive white sandstone that marks the base of the upper group.

About halfway between the forks of Yampa river and the town of Craig, near Woods ranch, or "Big Bottom," Yampa river cuts through a low anticlinal fold and exposes coals of the mid-

dle group along its banks (S). A number of valuable seams are probably accessible here. .

Craig District.—Near Craig are two openings on seams presumably of the upper coal group, namely, the Walker bank (U) and the Kimberly bank (T). The Walker bank is on the south side of the river, about 4 miles southeast of Craig. The seam measures 8 feet, and possibly more, of apparently good solid coal. The coal breaks out in cubical joint blocks and is without partings. This bank was opened sixteen years ago, and is usually worked during the winter season. Another seam, exposed about 25 feet lower down, is apparently about 4 feet thick.

The Kimberly bank (T) is on the north side of the river and about 2 miles east of Craig, near the stage road. The seam measured 8 feet of solid coal and is probably slightly thicker, as neither roof nor floor was exposed. It dips 14 degrees N. and has been opened by a slope starting from the surface outcrop. The coal is much weathered near the entrance, but distinctly improves in quality toward the end of the 150-foot slope.

Lay District.—Westward from the mouth of Williams Fork the intervals between the several coal groups decrease notably. A short distance east of Lay the coals of the three groups are embraced within a vertical range of 800 feet. The middle and upper groups in this locality have been prospected but little. Near Lay postoffice, within a vertical range of 250 feet, three coal seams have been opened whose aggregate thickness is forty-one feet. An additional four-foot seam is believed to exist within the same range and a ten-foot seam sixty feet higher, making in all fifty-five feet of coal within a range of 320 feet.

An entry in the lowest seam (called the Sweeney tunnel) exposes seven feet ten inches of coal, separated into two nearly equal parts by a twelve-inch streak of bone. Beneath a thick layer of bone now used as the floor of the mine another bench of good coal four feet thick is reported. One hundred feet above the Sweeney seam is the so-called Peacock seam. Here are nine feet of coal, unfortunately covered by a poor roof of clay. A four-inch layer of bone appears near the top, and locally another is found near the bottom. The coal is otherwise clear, bright and very tough. One hundred feet higher is a double seam containing twenty feet three inches of coal, divided into two nearly equal parts by a fifteen-inch layer of shale. Postmaster A. G. Wallihan, of Lay, the local representative of the Wisconsin Fuel and Mining Company, has driven a broad tunnel about 200 feet into the lower part of this seam. Blacksmith's coal is sent from this mine as far as Hayden, a distance of forty-five miles. Simple tests made by Mr. Wallihan lead to the hope that this will prove to be a good coking coal.

WOLF CREEK AND ANTHRACITE RANGE.

The rocks and coal in this district outcrop in a belt of general north-south direction, extending from Grassy Gap, on

the west side of Twenty-mile Park, to the flanks of Sand Mountain, on the east side of California Park, a distance of about twenty-five miles. The Coal Measures dip toward the west and pass beneath the black shale that forms the rolling prairie land of Hayden Valley. This district includes the coals both north and south of Yampa River, where the three groups cross in the canyon above Hayden. On the north side of Yampa River these are known as the Wolf Creek coals. North of Wolf Mountain this district includes the various coal properties of Anthracite Range.

Wolf Creek Valley.—Wolf Creek drains to the south from Wolf Mountain and joins Yampa River seven miles above Hayden. In its upper course it flows in a steep, narrow canyon through the massive sandstones that underlie the coal groups. Below this canyon it cuts diagonally across the outcrop of the lower coal group and these coals are well exposed in a number of prospect drifts. One entry, about forty feet in, showed a face of four feet two inches of good coal under a shale roof. Below this the stream bed follows near the outcrop of the middle coal group for about four miles and these coals are well exposed in a number of recent openings. On Yampa River, opposite the mouth of Wolf Creek, openings have been made on three seams of the middle group, which serve as a good typical section of the group for this vicinity. The uppermost seam measures two and a half feet at its outcrop. Under this are about seventy feet of sandstone and shale, and then the coal known as the Wadge seam, which measured eight feet three inches of clean, bright coal, without parting. This coal seam is locally known as one of the most perfect in the field, as to quality of coal, character of the seam, and its ability to withstand weathering. A sample for analysis was taken at the breast of an old working (K) about 250 feet in and a second sample of the same seam in a recently opened drift (O). Both of these represent the whole face of the seam—eight feet three inches of coal.

ANALYSIS OF COAL FROM WADGE SEAM, ON YAMPA RIVER.

[F. M. Stanton, Analyst.]

	Sample K.	Sample O.
Moisture	9.49	10.59
Volatile matter	37.89	36.75
Fixed carbon	47.04	47.53
Ash	5.58	5.13
	100.00	100.00
Sulphur	.41	.44
Loss of moisture on air drying	2.40	4.00

About ninety feet stratigraphically below the Wadge seam is a thick seam of coal opened by an entry driven under the stage road on the north side of the river. This seam measures sixteen feet three inches, and possibly a little more, of which the lower

seven feet of coal have been mined out. This was separated from the upper eight feet of coal by fifteen inches of sandy parting.

On a side gulch entering Wolf Creek from the east, two miles above the river, a seam of the lower group has been opened, exposing coal at least six feet four inches thick, with two or three thin partings. The partings, however, are not constant. Just over the divide to the east, on Butcherknife Creek, are several openings on coals of this same group. An entry recently made on Mr. Gartman's property (L) exposed coal measuring as follows:

SECTION OF COAL ON GARTMAN PROPERTY.

	Ft.	In.
Coal	5	6
Bone		4
Coal		6
	6	4

A sample representing all but the four inches of bone showed the following analysis:

ANALYSIS OF COAL (SAMPLE L) FROM GARTMAN ENTRY, ON BUTCHERKNIFE CREEK.

[F. M. Stanton, Analyst.]

Moisture	10.92	
Volatile matter	36.53	
Fixed carbon	46.73	
Ash	5.82	
		100.00
Sulphur	.60	
Loss of moisture on air drying	3.40	

Anthracite Field. Intrusive igneous rocks of several types cut the coal-bearing beds at many points. Within the coal field the district in which this activity was greatest centers about Pilot Knob and Wolf Mountain. By far the most common of these intrusive rocks is the basalt that composes Pilot Knob, Wolf Mountain, Hooker Mountain, and many lesser peaks and ridges of this vicinity. The whole district is known as the Anthracite Range. The rock itself is a typical olivine-basalt. The basaltic peaks have the appearance of huge dikes, probably marking the fissures through which this rock ascended. Smaller dikes of aproximately vertical position radiate from the larger masses, and sills of the same material are found interbedded with the sediments in many places.

The heat accompanying the intrusion of the molten rock has influenced to varying degrees the character of near-by coals. In general the result of this baking process has been the driving off of the volatile hydrocarbons. In this way all intermediate

grades of coal ranging from bituminous to anthracite have been formed.

It is evident that where the source of the heat was fairly uniform in its relation to the coal seams the resulting alteration of the coal may be expected to be correspondingly uniform over a like area. This result is best attained in the cases of the intruded sills. Two reasons may be given for the fact that many of these intrusions have taken the form of sheets lying parallel to the coal seams: (1) The basalt, when molten, is a comparatively fluid magma and more readily forces its way into thin crevices than would the magmas of more acidic rocks. (2) These crevices would more easily open in the sedimentary series between the beds than across them.

On the other hand, the intruded lava sheets do not seem to have exerted an influence through more than 50 to 70 feet of intervening strata, and probably not often so far as this. A contact of coal and lava would probably have resulted in burning or complete coking of the coal. In order that any given seam may be changed to good anthracite there is necessary a comparatively delicate adjustment of this relation of coal seam and lava sheet, the achievement of which depends on purely accidental circumstances.

The property known as the Crawford tract is situated on the county road that crosses the Anthracite range west of Anthracite post office. Openings on the seams of this tract furnish perhaps the best known of the anthracized coals. Three entries are located close to the public road. The two uppermost on the road and one on a side gulch to the north appear to be on the same seam. This measures at least 11 feet in thickness, with a parting of 6 to 8 inches near its middle. A massive sheet of basalt is plainly exposed on the north side of the creek, dipping under the lower seam at an interval of about 50 feet. The coal seam shows varying degrees of anthracization. It is thought that this seam corresponds to the lowest seam of the middle coal group as exposed at the mouth of Wolf Creek, both in details of its measurements and in position at the base of the group. Samples (E and G) from two entries on this seam were taken for analysis. They were obtained by making cuts across the face from top to bottom of the lower bench of 6 to 7 feet of coal.

ANALYSES OF COAL FROM 11-FOOT SEAM ON CRAWFORD TRACK.

[F. M. Stanton, Analyst.]

	Sample E. Per cent.	Sample G. Per cent.
Moisture	6.94	6.85
Volatile matter	3.42	23.84
Fixed carbon	75.61	60.00
Ash	14.03	9.31
	100.00	100.00
Sulphur	.57	.55
Loss of moisture on air drying	4.20	4.20

A comparison of these results with analyses of typical Pennsylvania coals, both anthracite and bituminous, shows that Sample E is an exceptionally high grade of anthracite, so far as its percentages of fixed carbon and volatile matter are concerned, but that its commercial value as such is materially impaired by the high percentage of ash.

Sample G was taken from an entry on the same seam, only 40 rods distant. Its composition would class it as a bituminous coal of good quality.

A smaller seam, measuring about 28 inches, has been opened in a number of places a short distance beneath the large seam just described. Reports of analyses of this coal show it to be anthracite of excellent quality, containing only a normal percentage of ash. No statement can be made as to its probable extent.

The lowest opening on the road is on a seam 100 feet or more stratigraphically higher in the series than the seam just described. This coal measured 6 feet 2 inches, without partings, at the breast of a 140 foot drift, and is supposed to be the Wadge seam. A sample (F) cut from the whole face shows on analysis a composition very similar to that of the Wadge coal. This analysis is as follows:

ANALYSIS OF COAL (SAMPLE F) FROM BITUMINOUS SEAM ON CRAWFORD TRACK.

[F. M. Stanton, Analyst.]

	Per cent.	
Moisture	11.74	
Volatile matter	35.31	
Fixed carbon	47.36	
Ash	5.59	
		100.00
Sulphur	.56	
Loss of moisture on air drying	5.70	

To the south and east of the gap above the Crawford mines and near the road are several openings on coal seams of the middle group, so badly fallen in that the coals were not measured. One tunnel near the road was reported to have opened a thick seam of coal that ran high in ash, and it is thought that this may be the same seam as the thicker one opened in the Crawford property, which also carries a considerable percentage of ash, as shown by analyses E and G on page —.

A seam of the lower coal group has been opened and mined for domestic use on the face of a steep ridge in a school section to the east of the openings last mentioned. This opening showed about 8 feet of solid coal, but could not be measured exactly, as the lower part of the coal was standing in water. The seam dips about 10 degrees W. From this point northward the lower coal group outcrops along the east side of Pilot Knob and is

exposed in the openings on the head of Miller Gulch and in those near the Ducey tunnel. On Miller Gulch a recently opened prospect was sampled for analysis (H). This sample was cut across the face of a seam 4 feet 1 inch thick.

ANALYSIS OF COAL (SAMPLE H) FROM PROSPECT AT HEAD OF MILLER GULCH.

[F. M. Stanton, Analyst.]

	Per cent.	
Moisture	10.80	
Volatile matter	34.32	
Fixed carbon	49.41	
Ash	5.47	
		100.00
Sulphur	.58	
Loss of moisture on air drying	5.70	

The Ducey tunnel is on the east side of Pilot Knob. It has been worked for about nine years to supply the settlers on the head of Deep Creek, and the coal has been hauled as far as Hahns Peak. The old tunnel showed 5 feet of solid block coal dipping lightly to the west. The coal does not appear to have been affected by its proximity to the huge basalt mass of Pilot Knob. Fifty feet above the old tunnel a seam having a thickness of 5 feet 2 inches has recently been opened.

About three miles northeast of Pilot Knob a thick sheet of basalt, known as the "rim rock," is exposed, lying in a nearly horizontal position and interbedded with the lower coal group. The property known as the Shelton tract overlies this intruded sheet. Coals of this tract have been extensively prospected, both by pits and bore holes, and anthracite is reported to have been found over most of the field that lies directly above the basalt sheet. The outcropping rim of the sheet is continuous for a number of miles to the north, and it appears to occupy a single horizon in the sedimentary series. If this is true, its effect on the overlying coal seams may have been uniform over a very considerable area.

The outcrop of the coal bearing series continues, in part, at least, from the "rim rock" northward along the east side of California Park, lapping against the slopes of Sand Mountain. Little is known concerning the coal in this extremity of the field, for much of the ground is covered by debris of igneous rocks.

The field within which the three coal groups are known to have been affected in places by the heat from the intrusion of igneous rocks is probably limited to about 25 square miles. This estimates does not include the Quaker Mountain district, whose coal seams are considered to be of later or Laramie age, and in most cases of inferior quality to the older seams of the field, although, as explained in a later paragraph, some of these Laramie coals have been altered to anthracite coal. Of this area

of 25 square miles a considerable portion is occupied by the basalt, both as rock in place and in the form of heavy talus cover. The actual area in which anthracite coal is now known to be present or in which conditions seem favorable for its occurrence probably does not exceed 10 square miles.

LOWER ELKHEAD AND FORTIFICATION CREEKS.

The center of the main Yampa field, as mapped, is occupied by a thick series of slightly consolidated beds of light-colored sands and clays, containing many coal seams. This formation appears to lie comfortably over the lower beds of Montana age, and, as a few marine shells were found in it north of Hayden, it seems probable that it is of Laramie age. The coal that it contains has been prospected somewhat and in one case at least has been mined for local use.

The Seymour opening (Z), on Dry Fork of Little Bear Creek, a tributary of Fortification Creek northeast of Craig, is on a thick seam of this coal. The roof is a compact blue clay, well exposed for a thickness of 6 feet. This seam of solid, black, bright coal, at least 17 feet thick, shows for 150 feet in natural exposure in the creek bank near by. The coal itself, however, seems to be of comparatively light weight.

The coals exposed at the "potholes" of Elkhead Creek, although in some cases anthracized by the intrusion of igneous sheets, belong to the unconsolidated beds of the Laramie. To this formation also belong most of the coals on Quaker Mountain and some seams on the north side of California Park. At the extreme east end of Quaker Mountain, however, several prospects and tunnels of the Egeria Coal Company (V) have opened seams of coal whose proper classification is not certain. From the character of the associated shales and sandstones it is thought that they probably belong to the Laramie, but owing to the fact that the middle and upper groups of the Montana coals have been lost sight of in this vicinity under the basalt cover, this opening may be on one of these older coal seams.

New Mines.

BOULDER COUNTY.

In November, 1905, the Centennial Coal Company, whose main office is located at 1628 Stout street, Denver, with James Hood superintendent, opened a mine one mile south of Louisville and about 700 feet west of the C. & S. R. R., with which it since has been connected by a short spur. The vein lies at a depth of 261 feet and has a thickness of 6 feet 6 inches, and the coal is of high grade lignite, dipping slightly southeast. It is worked on a double entry room and pillar system, and the ventilation is produced by a 12-foot diameter Crawford & McCrimon forcing fan installed at the top of the air shaft, which was sunk soon after developing operations commenced below. Nearly all the underground work done so far has been confined to entry driving, and it is the intention of the officials of the mine to continue the forcing of the entries until a certain distance is reached and then work the rooms retreating. For this reason the output of the mine will be kept at a low minimum for some time to come.

I take this opportunity to express my appreciation of the management's high regard for the health and safety of their employes, made manifest by their precaution in making their second opening at least fifteen months before the law demanded it.

THE INDEPENDENT MINE.

In the summer of 1905 a small group of Louisville miners opened a mine on a 40-acre tract of land, which they had secured by a lease and option, one and one-half miles northeast of Louisville, and since which date has been in continuous operation. It is opened by a single shaft 6 by 8 feet, having two feet partitioned off on one side for a ladder and temporary airway, and is 214 feet deep and is well timbered its entire depth. The seam lies nearly level, 5½ feet thick, and is a good quality of lignite. The equipments are a double, 10 by 12 inches, second motion, Jackson hoisting engine; one 60 H. P. Atlas boiler and one three-machine air-compressor. The mine has no railroad connection and the product is hauled by wagons. On September 1, 1906, the mine was bought by the Northern Colorado Power Co., which is constructing a large electric plant on its adjoining property one-third mile southeast of the mine. Since this sale has been made the Independent has been operated under a lease by the original owners.

THE ELECTRIC MINE.

The Electric Coal Co., with J. Simpson of Lafayette as president and general manager, is opening a mine at a point 1¼ miles northeast of Louisville and about ½ mile north of the Louisville & Lafayette branch of the C. & S. R. R. The area leased embraces 144 acres of coal land, which the company prospected by eight drill holes at widely separated points on the property, and found a continuous vein of coal varying from 4 feet 6 inches to 5 feet 8½ inches in thickness. At date of this writing the shaft is down 150 feet, and has 56 feet more to go to reach the coal, and the sinking is progressing at the rate of 4 feet a day.

THE SENATOR MINE.

The Willoughby Coal and Land Co., with Richard W. Morgan of Lafayette as superintendent and general manager, has just completed the opening and equipping of a new mine situated one-third of a mile southeast of the Town of Lafayette, on an 80-acre tract of land leased from Mrs. A. S. Willoughby. The shaft is 13 feet 6 inches by 5 feet 6 inches in the clear and 116 feet deep, ventilated by a 10-foot forcing fan. The coal is of lignite variety, and the vein is 7 feet 7 inches thick, dipping sixteen degrees northwest. A spur 800 feet long connects the mine with the Denver & Lyons branch of the Burlington R. R. From the fact that entry driving is just now commenced, it will be some time before the mine will attain its maximum daily tonnage.

THE NONPAREIL MINE.

The mine is owned by the Brooks-Harrison Fuel Co., and is situated on a tract of land known as the Murphy Ranch, three-quarters of a mile south of the Town of Louisville and 900 feet east of the Louisville Junction & Boulder branch of the C. & S. R. R., with which the mine is already connected. The Denver & Lyons branch of the B. & M. R. R. also passes within one and one-quarter miles east of the property. It is opened by a three-compartment shaft 13 feet by 6 feet 11 inches in the clear and 273 feet deep to the bottom of the coal, and is timbered with 3-inch planks. The shaft is sunk to a total depth of 300 feet, and the 27 feet from the coal down is used for sump. The work of sinking was completed September, 1906, since which date the time has been occupied in general construction work on the surface and shaft-fitting, hence shipping has not yet commenced. The hoisting, tipple, and power equipments consist of a Scoville double (100 H. P.), second motion engine, geared at 4 to 1. The chute is fitted with shaker screens 6 feet wide and 24 feet long having 1½ inch and 2½ inch perforations, one American air compressor to run four mining machines, two Nagle boilers 66 inches by 16 feet with four-inch flues. The coal is mined with machines on the room and pillar system. The

vein is 9 feet, 4 inches thick and is interstratified by a 4-inch band of shale 3 feet above the bottom, dipping 1½ degrees southeasterly. Ventilation is to be produced for some time by a fan placed at the mouth of the shaft's air compartment. The character of the coal is essentially lignite and is a good grade of fuel for domestic and steam purposes. With the excellent railroad facilities at hand for the disposal of the product and its accessibility to Denver and other important markets, the property when in full running order, is expected to be a notable factor in increasing the tonnage of Boulder county. J. E. Brooks is manager, with the main office at Louisville.

THE SUNNYSIDE MINE.

The Vesuvius Coal Company is about completing the equipping of a new shaft recently sunk at a point 1,225 feet east of the old mine, on its Sunnyside property near Louisville Junction. No. 1 shaft, which was opened in the year 1900, and which has been intermittingly operated up to the present time, was too small of dimensions, and its hoisting equipments too light to handle the daily tonnage that the company desired to have mined; therefore the opening of a new shaft, whose appliances are capacitated for an output of 700 tons daily. This new shaft (No. 2) is 12 feet 4 inches by 8 feet in the clear, with two compartments, and 339 feet deep, and is to be connected by two parallel entries driven from No. 1. These entries were, on the 15th of December, within 160 feet of being through, and after the connection is made No. 1 will be used as an escape and air-shaft, upon which a 5 by 16-foot fan will be installed to ventilate the mine. The hoisting cages are automatic dumping, and the chute is fitted with shaking screens for the preparation of the coal into three different classes to suit the demand of the market for the various sizes. The land to be developed contains 320 acres, and there are good reasons to believe that 85 per cent. of this entire area is imbedded with at least two workable veins of coal. The upper vein lies at a depth of 210 feet, and the lower, which is the vein now being developed, varies from 4 feet 7 inches to 5 feet in thickness. Inclination of the measures is from 2 to 3 per cent. dipping southeast. In quality the coal of the Sunnyside property ranks with the highest grade of lignite found in the South Platte field, and the product of the mine should be in great demand. Connection with the C. & S. R. R. is already completed by a 1,900-feet spur; also a right of way has been secured, and the material is on the ground to connect with the B. & M. R. R., a distance of about half a mile. Fifteen new cottages for the accommodation of the employes are in course of construction.

FREMONT COUNTY.

THE COLORADO CENTRAL C. & M. CO.

Is sinking a 12 by 7-foot 4-inch three compartment shaft two miles south of Canon City. The shaft is to be sunk to the

lower, or "Canon City" vein which lies at a depth of about 500 feet, and which is expected to be reached soon.

HUERFANO COUNTY.

THE OAKDALE NO. 1 MINE.

During the month of August, 1906, Fruith & Autrey, of Walsenburg, commenced the opening of a mine on 1,160 acres of leased ground, situated six and a half miles northwest of the town of La Veta. The present openings consist of two parallel slopes driven on the dip of the vein which is nearly due west. It is the intention of the operators to build three miles of railroad track to connect with the Denver & Rio Grande R. R. at a point a few miles west of La Veta. The character of the coal is semi-bituminous, and the vein varies from 7 feet to 11 feet 6 inches in thickness. At present the product is hauled by wagons.

THE PINON MINE.

The Rocky Mountain Fuel Co. is about to complete the fitting of the new shaft recently sunk on its Pinon property at Shumway, Huerfano county. The shaft is 135 feet deep and opens the lower vein. The hoisting appliances and other surface equipments are of the most modern and up-to-date types, consisting of a first motion hoisting engine, self dumping cages, electric power plant and boilers. An air shaft has also been sunk upon which a fan will be installed as soon as developments demand it. The vein is 5 feet 2 inches thick, and the coal is of the semi-bituminous variety, and is an excellent fuel for domestic purposes. It is expected that when fully developed the mine will be a large producer.

LAS ANIMAS COUNTY.

THE REILLY CANON MINE.

Of all the undertakings along the lines of new developments that have transpired in the coal industry of the State during the period embraced in this report, none promises to be of greater importance, and, as now outlined, of greater magnitude, than the new coal and coking plant which is being opened and constructed by the Carbon Coal & Coke Company in Las Animas county.

This new camp is located in Reilly canon, one and a half miles from its entrance and nine miles west of the town of Trinidad. Reilly is one of the many canons which are tributary to the Purgatoire valley and which are so noted for the prolificacy of their coal beds and the high grade of the product for steaming and coking purposes. Active operations of grading and building outside and of entry driving underground were commenced during the summer of 1906 and the work has been energetically pushed with all the men that could be advantageously employed ever since, and yet it will take many months before the plant

will be fully completed. There is also to be built a coal washery of large capacity to eliminate impurities that the coal may carry, and it is intended that all the output of the mine will be manufactured into coke on the ground. The land to be developed embraces over two thousand acres, which are located geologically that they should contain from two to three veins of coal. The present openings consist of three pairs of level tunnels situated several hundred feet apart and entering upon the outcrop of the coal near the foot of a rolling plateau which forms the west side of the canon. The vein under exploitation is six feet thick, of the coking variety, having a comparatively good roof and dipping slightly to the southeast. All of the underground development up to the present time has been concentrated to entry driving, of which there is over 2,000 feet already done, and the rooms are not to be opened until the tipple and transportation facilities are completed. Ventilation of the mine is produced by furnaces for the present, but these are soon to be supplanted by a fan. Railroad connections will be by an 8,000-foot spur off the Colorado & Wyoming railroad. The camp site is located on a slightly elevated point on the west side and about half a mile above the works in the canon, and it is the intention of the company to make it one of the most modern and attractive coal camps in Colorado. Ninety dwelling houses, some with water and baths, an elegant office, hotel and school buildings are in the course of erection and will be up to date in every detail. When the mine is fully equipped and all the arrangements for the handling of the product are completed, this camp will be an important factor in the contributing to the increase of Colorado's annual output. President and general manager of the company is Mr. Franklin Guiterman, of Denver; Mr. F. P. Bayles, of Trinidad, is superintendent, and Mr. B. W. Lloyd general foreman.

THE MORLEY MINE.

The Colorado Fuel & Iron Company has commenced opening a mine at Morley, on the main line of the Santa Fe railroad, eight miles south of Starkville. Developments to date consist of four drift entries and parallel air courses 500 feet long, which are driven on a vein seven and one-half feet thick, outcropping on both sides of the main canon, through which the railroad passes. The vein has a sand rock roof and the coal is of the high-grade coking variety, and the company anticipates making this mine one of the largest producers of the county.

ROUTT COUNTY.

THE OAK CREEK MINE.

Preparatory for the arrival of the Moffat railroad into the Yampa field, which is expected by next August, the Oak Hills Coal Company is opening a mine on its property in the Oak creek district, twelve and a half miles in a northwesterly direction from

the town of Yampa. The openings are situated on the railroad course, driven on an 8 foot 6 inch vein of coal, characterized as bituminous, dipping 15 degrees, and it belongs to the lower of survey line and they consist of two parallel slopes, main and air the three coal-bearing series contained. At present the product is hoisted from the mine by a temporarily installed steam engine, and the permanent equipments will not be installed until the railroad is in. The main office of the company is in the Iron building, Denver. S. M. Perry is general manager and J. G. Perry is superintendent.

WELD COUNTY.

GOLDEN ASH MINE.

During the summer and fall of the year 1906 the Consolidated Coal & Coke Company, under the management of Mr. Charels L. Baum, whose headquarters are at the Barth block, Denver, opened and equipped what is known as the Golden Ash Mine No. 1. It is located near the center of (school) section 36, township 2 north, range 68 west, eight miles northeast of the town of Erie and about seven miles west of Fort Lupton. The shaft and surface plants are capacitated for a larger daily output than any mine heretofore opened in Weld county, and the mine is intended, when its workings are fully developed, to rank amongst the foremost producers of the South Platte field. The property embraces all of section 36, and previous to sinking the main shaft the ground was well prospected by several drill holes and an air shaft, which showed that the measures are very regular and that the vein has remarkable persistency and uniformity of thickness throughout the entire area. The shaft is 16 feet 3 inches by 7 feet 11 inches in the clear, divided into three compartments, and 202 feet deep. Hoisting, power, steam plant and other surface equipments are briefly as follows : A Crawford & McCrimmon double, first motion, 250 horse power hoisting engine, with a five-inch diameter drum, winding a one and one-half inch Leschen Hercules rope over a five-inch diameter sheave wheel; two single-decked cages; 3,000 pounds each, made at the mine by William Saunders; one Phillips cross-over tipple, which stands twenty-seven feet above the railroad tracks, delivering the coal into a chute fitted with a link belt shaker screen twenty-eight feet long, with four and one-half inch, three and one-half inch, two and one-half inch and one and one-half inch perforations, driven by a twenty horse power Chandler & Taylor engine; one Westinghouse electric generator, 100 K. W., 250 volts, directly connected to a sixteen by sixteen Brownell Twentieth Century engine, supplying power for the electric mining machines. Steam is supplied by a battery of four high pressure tubular boilers, 125 horse power each, manufactured by the Brownell company, Dayton, Ohio. As a precautionary measure against fire, a circular water tank was built, with a capacity of 35,000 gallons. The tank stands thirty-two feet above the ground and is situated

Page 138, line 1, should read:

"The openings are situated on the railroad survey line and they consist of two parallel slopes, main and air course, driven on an eight foot six inch vein of coal, characterized as bituminous, dipping fifteen degrees, and it belongs to the lower of the three coal bearing series contained.

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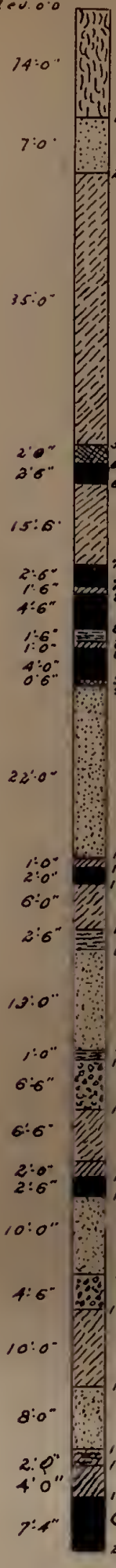
COLUMNAR SECTION OF FORMATION ENCOUNTERED IN SINKING NO. 1 SHAFT OF THE CONSOLIDATED COAL & COKE CO.



150 feet from the shaft, and has pipe line connections leading to various localities of the surface building, so that all points may be commanded by a hose. Water supply is obtained from a 468-foot well, situated forty feet from the shaft. The well is cased for 307 feet with four-inch casing, and the water rises by natural force to within sixty-five feet of the surface. The water is impregnated with soda and for boiler use is unsurpassed, doing away with the use of boiler compounds. The well is equipped with a Marsh artesian well pump. Yard tracks, four in number, have a capacity to accommodate 2,000 tons. Four miles of railroad, built in 1906, and having its starting point near the Washington mine, connects the property with the Brighton & Boulder Valley branch of the U. P. R. R. The vein under exploitation is, at the face of the present workings, eight feet thick, lying nearly horizontal, having a grayish shale roof and an arenaceous bottom, and the analysis below shows the coal to be a fairly good grade of lignite.

Seam	Fixed Carbon	Volatile	Ash	Moisture	Made by
Lower	50.09	32.88	4.40	12.40	H. E. Wood, Denver

Mining operations are conducted on the double entry room and pillar method, and the coal will be mined by electric cutting machines exclusively. At the date of this writing the main entries are in 600 feet from the shaft, and two pairs of cross entries are already turned. Ventilation is produced by an eighteen-foot diameter Crawford & McCrimmon fan, situated at the top of a six-foot by eight-foot air shaft. That the mine has not attained a larger daily output is due to the fact that the officials have, from on economical point of view, decided to work on the retreating system, that is, to drive the entries to the boundary lines and commence with the room work at the furthermost points. Under this method of operating a much larger percentage of the coal is won and with a less percentage of slack, "creep" along the entries due to the weighting action of the roof is almost totally avoided, thus facilitating the hauling and vastly reducing the cost of timbering and maintenance of the entries and trackage, enhancing the safety to life and limb of the employes and increasing the efficiency of the ventilation by an extremely large margin through the complete elimination of leakages of the air-currents in the various districts of the mine. The new camp is named Dacono. The judicious arrangements of the surface plants and the up-to-date manner of developing the workings, together with the precaution taken for the protection of the physical welfare and safety of the employes, is highly creditable to the management.

THE NORTHWESTERN MINE.

This mine, which has been idle for six years, was reopened and equipped December, 1905. It is the property of the U. P. Ry. Co. and is now operated under lease by the King Coal Co., with Mr. A. J. Vivian as manager, and headquarters at the

Colorado building, Denver. The mine is situated half a mile southeast of the town of Erie. It is opened by a shaft 123 feet deep. The present daily output is 100 tons, but the management expects to more than double this in the near future. Ventilation is effected by a twenty-foot forcing fan, capable of producing 75,000 cubic feet of air per minute, if necessary. The vein is seven feet thick, dipping slightly to the southeast, and the character of the coal is lignite and is a good grade of fuel for domestic and steam purposes. There are now thirty men employed and the force will be increased with further development of the mine.

TRANSFERS OF PROPERTIES.

BOULDER COUNTY.

July 5th, 1905, the Monarch mine, formerly owned and operated by Joseph Mitchell and Son, was bought by the National Fuel Co., whose headquarters are located at the Colorado building, Denver. Mr. H. Van Mater is president and general manager. Since the new company has taken charge, the daily output of the mine has been considerably increased.

Nov. 8th, 1906, the Blue Ribbon mine, which is located one and a half mile east of Lafayette and was owned and operated by Messrs. Padfield and Marfel, was bought by the Park Dale Coal Co., Mr. H. Van Mater acting as president and general manager. The new company has acquired a lease on a 160-acre tract of land adjoining, which will be developed with the original holdings and is already working on the extension of the plant. The mine is to be equipped to handle a daily output of 400 tons. Arrangements are completed for building 7,000 feet of track to connect with the B. & M. R. R. Heretofore the product of the mine was hauled by wagons.

GARFIELD COUNTY.

March 1st, 1906, the Coryell Mine Leasing Co. bought the Coryell mine, which is located near Newcastle. The new company has already made great improvements on the old method of conducting the underground workings of the mine and its operations are now conducted on the most healthful and safest basis conceivable with modern ideas. Since the purchase was made the management has installed a new ventilating fan of much larger capacity than the old one, also a complete system of high pressure water lines has been put in, and every point in the workings is reached by water and sprinkled when necessary. The company's main office is at the Opera House block, Denver. Mr. J. W. Cummins is president and Mr. W. E. Parnell, manager.

On April 15th, 1906, the Victor Fuel Co. bought the Bowen mine, formerly owned by the Union Coal & Coke Co. The mine is located six miles north of Trinidad in Las Animas county,

and its output has been materially increased since the new company took charge.

MINE FIRES.

On October 6, 1905, the surface plant of the Fremont mine, including engine and boiler houses, shaft's head frame and other adjoining equipments, was completely destroyed by fire reported to have started at an electric blower in the boiler house. When the fire occurred there were sixty men in the mine, all of whom were brought to the surface through the air shaft by means of a hemp rope equipped with a cross-piece and brace strap to sit on as each individual was being hoisted, which was done by hand power. The air shaft was equipped with a small hoisting engine and cage to be used as an escape way in case of emergency, but the fire soon destroyed the steam pipes leading to the air shaft and thus cut off the steam and rendered the hoist useless. In less than two months the mine was equipped and in full running order. One of the most remarkable acts of heroism was that displayed by Thomas Tantrum, pit boss, who was on the surface when the fire was first discovered, and when the conflagration had gained such headway that all hope of saving the shaft buildings was gone, Tantrum, doubtful whether he would again see daylight, mindful only of his men underground, and inspired by a great desire to be with them and comfort them, descended, and remained until the last man was out.

In June, 1906, a fire started in the boiler house of the Industrial mine and destroyed the entire surface buildings. Some time previous to the fire, portions of the ladderway in the air-shaft, had been torn away by falling ice which had accumulated during the winter season. The damaged ladderway had not yet been repaired and consequently the men below at the time of the fire, had to be hoisted to the surface by a hemp rope and hand power.

Engle Mine.—Shortly after the dinner hour on May 23, 1906, a fire was discovered in a cross-cut between the main entry and its parallel air course, near the seventeenth east entry, or a little over a mile from the entrance of the mine. Attention was first given to the withdrawing of all the men from the mine, and by the time this was accomplished, the fire grew to such an extent that they were unable to extinguish it, and as a result, isolating stoppings had to be built on the entries outside of the fire to prevent its further spreading. The origin of the fire was incendiary and was confessed by Manuel Martinez, a Mexican, and a nipper in the mine. The fire is still burning, but it is being confined to a smaller territory by advancing the stoppings, and it is expected that soon the fire will be extinguished.

IMPROVEMENTS.

Following is a brief description of the mechanical installations and other building improvements at the old mines by the various companies during the year 1906, made for the purpose of bettering the sanitary conditions in the mines, as well as outside, and for the facilitation of underground haulage and the handling of the product in general.

THE COLORADO FUEL AND IRON COMPANY.

BERWIND MINE

One new electric locomotive, two new seventy-four-foot 100 tons Fairbanks track scales, and built a sixty-stall mule barn.

COAL CREEK.

New tipple, shaker screens and an Ottumwa box-car loader, 600 tons capacity.

CUATRO.

An eighteen-foot diameter fan to ventilate the mine. Heretofore the ventilation was produced by furnaces.

FLORESTA.

Installed a new haulage engine.

SPRING GULCH.

A water pipe line for the purpose of sprinkling the haulageways and other portions of the mine.

HEZRON.

One air-compressor, two pumps and a water pipe line in the slope.

NONAC.

One steam separator and trap for fan, and one boiler.

PRIMERO.

Installed tail-rope haulage of 2,000 tons daily capacity, and one pump.

PICTOU.

Two new sets of Fairbanks scales, seventy-four-foot, and 100 tons capacity. Built new tipple and put in a new haulage engine.

QUINTO.

Sixteen new dwelling houses for the employes.

ROUSE.

Two new air-compressors.

ROBINSON.

New tipple, shaking screens and box car loader.

ROCKVALE.

One electric hoist to pull from the dip workings.

SOPRIS.

Aerial tram to convey the waste from the washery.

STARKVILLE.

New ventilating Stein fan to assist the other two fans in ventilating mine.

TOBASCO.

One additional pump for Peerless Joint water line, one electric lighting plant and thirteen new cottages.

TERCIO NO. 3.

Installed water piper lines to sprinkle all the workings, also an electric shot firing system, and built several new wash houses for the men.

WALSEN

A new air shaft, 100 square feet area, 157 feet deep, on which a new eleven feet by eight feet eight inches Capell fan, driven by a fifteen-inch by fifteen-inch engine, is to be placed immediately.

One of the noteworthy features of improvement for the safeguarding of life was made by the Colorado Fuel and Iron Company, and which reflects great credit on the management, and that was the introduction of shot-lighters in the various mines operated by the company. This is a requirement not stipulated by the law, and is one of great importance. It is a humane move and no doubt will soon be followed by all mine operators.

THE VICTOR FUEL CO.

THE BOWEN MINE.

Installed a ten-ton Goodman electric locomotive, slack conveyor to convey coal from the screens to the boilers, a set of pit-car scales, boilers reset and remodeled, Ottumwa box car loader, equipped with the latest improvements: a boarding house and also ten new dwelling houses were constructed, and an addition to the mule stables.

CHANDLER.

A new engine put in to run the ventilating fan, a new water tank of 40,000-gallons' capacity was built, and water system constructed to furnish water to the tenants in the camp, fifteen dwelling houses, a doctor's office, a blacksmith and carpenter shop were erected.

DELAGUA.

Installed three electric haulage locomotives, a new lathe and bolt machine, a feed water heater, the washery was remodeled with the most modern machinery. There is in course of construc-

tion an aerial tramway for the disposal of waste from the washer, two new "larry cars" of the latest model were put in at the coke ovens. The washer and power house were covered with corrugated iron, two fine boarding houses, a new office building, an electric locomotive repair shop, and an addition to the superintendent's house were constructed; also a considerable extension was made to the water system.

GRAY CREEK.

Built a mule stable, office building and twenty-five cottages and a twenty-one room boarding house. Installed a feed water heater for boilers, added seven thousand feet to the water system, a lathe and drill press and the old washer was remodeled with modern equipments.

HASTINGS.

A slack conveyor to carry coal from screens to boilers, a mine office building, two sets of railroad track scales and twenty-five cottages built. Improvements in course of consctruction: Coal washing plant, an aerial tramway for the disposal of waste from the washer, new tipple to replace the old one; crushing and screening plant for the preparation of coke for domestic use, and the town water system is being extended to the new dwellings above reported.

MAITLAND.

An additional coal bin in connection with the tipple, new revolving and shaking screens of greater capacity than those heretofore used, a lathe and drill press and a feed water heater; a new blacksmith and carpenter shop, twenty new dwelling houses and one boarding house, and a 40,000-gallons' capacity water tank were installed and built.

RADIANT.

A fourteen-foot fan replacing the furnace for the ventilating of the mine was installed, three Sullivan long-wall and one Jeffrey electric mining machines, one electric pump in the mine were added. The water system in the camp was extended. There are also in course of construction a ten-room house for the superintendent and twenty-five three, four and eight-room cottages for the employes.

THE ROCKY MOUNTAIN FUEL CO.

FRANCISCO MINE.

An electric locomotive for mine haulage was installed.

MAGNET.

Put in a new hoisting engine, new fan to replace the old one burned, tipple remodeled and new boarding house built.

PIEDMONT.

Installed electric pump, water pipe line and new screens.

BOULDER COUNTY.

STANDARD MINE.

During the early part of this biennial period a seven by ten foot air shaft was sunk and an eighteen-foot Cole fan installed which produces 50,000 cubic feet of air per minute at moderate speed.

STRATHMORE.

A new air shaft was sunk near the face of the workings and the old shaft was discontinued and filled up.

FOX.

Installed a new air compressor, one boiler, new hoisting rope in main shaft, two pumps and two mining machines.

DELTA COUNTY.

KING MINE.

The Juanita Coal & Coke Co., near Paonia, is putting in railroad side tracks, tipple and gravity plane, preparatory to opening and developing a new mine on a eleven-foot vein of bituminous coal.

EL PASO COUNTY.

CURTIS MINE.

Installed a seven-ton Jeffrey electric locomotive for mine haulage.

RAPSON.

Put in an electric pump and one Sullivan cutting machine.

PATTERSON MINE.

Put in a ten-foot diameter Cole fan which greatly improved the sanitary conditions of the mine.

FREMONT COUNTY.

THE ROYAL GORGE MINE.

Built a two-mile spur to connect with the Santa Fe railroad near Canon City.

GARFIELD COUNTY.

SOUTH CANON MINE

Installed a new air compressor and two puncher mining machines.

GUNNISON COUNTY.

SILVER BROOK MINE.

A new fan to ventilate the mine.

PORTER.

Installed a larger hoisting engine and two boilers.

SOMERSET.

One Ottumwa box car loader, one underground pump, a set of shaking screens and two new overcasts.

HUERFANO COUNTY.

SUNNYSIDE MINE.

Electric power plant, electric cutting machines, boilers, box car loader and a ten-foot ventilating fan.

RUGBY.

Installed three new boilers at power house, leased 200 acres of land adjoining the original holdings of the company.

LAS ANIMAS COUNTY.

FORBES MINE.

Made two additional openings on the property, put in a tail-rope haulage and a set of shaking screens.

SUFFIELD MINE.

Built ten dwelling houses.

GREEN CANON.

Installed box car loader and two boilers, built six houses.

BLACK DIAMOND.

A new slope opened and one new boiler installed.

BRODHEAD.

Complete new re-equipment after the fire which destroyed the power plant, with new machinery at a cost of $18,000.00.

PRIMROSE.

Installed an electric power plant.

MESA COUNTY.

CAMEO MINE.

Installed a Jeffrey 100 K. W. generator and a marble switch board complete, a fourteen by fourteen-inch automatic engine, one Jeffrey electric locomotive, and two electric mining machines.

WELD COUNTY.

RELIANCE MINE.

Installed a compressor, two mining machines and one boiler.

COAL ANALYSES.

BOULDER COUNTY.

Name of Mine	Character of Coal	Fixed Carbon	Volatile Matter	Moisture	Ash
Rex No. 2	Lignite	46.25	33.6	15.4	4.2

FREMONT COUNTY.

Name of Mine	Character of Coal	Fixed Carbon	Volatile Matter	Moisture	Ash
Brookside	Semi-bituminous..	51.72	35.05	8.23	5.00
Coal Creek	Semi-bituminous..	53.04	35.70	7.26	4.00
Rockvale	Semi-bituminous..	51.10	36.70	5.00	7.20

GUNNISON COUNTY.

Name of Mine	Character of Coal	Fixed Carbon	Volatile Matter	Moisture	Ash
Crested Butte	Coking	56.93	37.23	1.79	4.05
Floresta	Anthracite	90.80	3.80	1.70	3.70

HUERFANO COUNTY.

Name of Mine	Character of Coal	Fixed Carbon	Volatile Matter	Moisture	Ash
Pictou	Semi-coking	51.05	40.63	3.27	5.05
Hezron	Semi-coking	53.30	37.80	1.60	6.20
Robinson	Semi-coking	56.00	37.00	2.00	5.00

LAS ANIMAS COUNTY.

Name of Mine	Character of Coal	Fixed Carbon	Volatile Matter	Moisture	Ash
Tercio	Coking	57.00	35.00	2.00	6.00
Sopris	Coking	58.40	32.18	0.52	8.90
Starkville	Coking	57.39	31.37	0.44	10.80
Berwind	Coking	54.81	39.20	1.24	4.75
Tobasco	Coking	53.26	38.05	1.04	7.65

LA PLATA COUNTY.

Name of Mine	Character of Coal	Fixed Carbon	Volatile Matter	Moisture	Ash
Porter	Coking	58.00	35.9	1.4	3.8
Hesperus	Non-Coking	53.7	40.1	2.3	3.9

PITKIN COUNTY.

Name of Mine	Character of Coal	Fixed Carbon	Volatile Matter	Moisture	Ash
Coal Basin	Coking	67.00	23.00	1.00	9.00
Spring Gulch	Coking	58.92	35.82	1.10	4.16

COKE ANALYSES.

Name of Mine	Fixed Carbon	Volatile Matter	Sulphur	Phosphorus	Ash
Crested Butte	89.010	1.510	.450	.030	9.000
Primero	82.680	1.540	.390	.150	15.240
Engle	82.000	1.398	.400	.002	16.200
Tobasco	81.670	1.400	.588	.002	16.340
Sopris	82.000	1.200	.550	.010	16.240
Starkville	82.600	1.336	.488	.002	15.850
Coal Basin	87.300	1.200	.650	.050	10.800
Spring Gulch	86.220	.920	....	....	12.820

Directory of Coal Mines.

DIRECTORY OF BOULDER

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Simpson	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Mitchell	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Hecla	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Rex No. 1	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Rex No. 2	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Gorham	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Industrial	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Acme	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Vulcan	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Monarch	National Fuel Co., Denver	H. Van Mater, Pres	
Parkdale	Parkdale Fuel Co., Denver	H. Van Mater	
Strathmere	Continental Fuel Co., Denver	M. S. Donnelly	
Sunnyside	Vesuvius Coal Co., Denver		
Matchless	Fox, Patterson & Evans Co., Louisville		
Fox	Fox & Patterson, Gorham		
Haywood	Great Western Fuel Co., Denver		
Vaughn	Maryland Land & Coal Co., Denver		
Standard	Standard Land & Coal Co., Denver		
Black Diamond	Kirkmeyer Bros., Boulder		
Shanahan	Kirkmeyer Bros., Boulder		
Rosser No. 7	Wm. Rosser, Gorham		
Centennial	Centennial Coal Co., Denver		
New Baker	Wm. Flavel, Erie		
Independent	Northern Colorado Power Co., Louisville		
Senator	Willoughby Coal & Land Co., Lafayette	R. W. Morgan	
Nonpareil	Brooks - Harrison Fuel Co., Louisville	J. E. Brooks	
Electric	Electric Coal Co., Lafayette		

COAL MINES.

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad connections	Remarks
Henry Denman		Fan	90,000	C. & S. B. & M.	
Henry Denman		Fan	30,000	B. & M.	
		Fan	20,000	C. & S.	
		Fan	80,000	C. & S.	
		Fan	38,000	C. & S.	
	Geo. Giles	Fan	25,000	C. & S.	
	F. J. L. MacCormac	Fan	25,000	C. & S.	
		Fan	65,000	C. & S.	
		Natural		B. & M.	
	Chas. P. O'Neil	Fan	40,000	C. & S.	
		Furnace			
J. Watson	Geo. H. Kennedy	Fan	30,000	C. & S.	
	J. W. Boyd	Fan		C. & S.	
	D. E. Evans	Fan	16,000	C. & S.	
	W. Fox	Natural	11,000	B. & M.	
	D. E. Brown	Fan	5,000	B. & M.	
		Natural			Closed down
	Eph. Nesbit	Fan	33,750	B. & M.	
	J. G. Kirkmeyer	Natural		None	
	J. G. Kirkmeyer	Natural		None	
	Wm. Rosser	Natural		None	
	J. H. Hood	Fan			
	Domenico Rotola	Natural			
					New mine
					New mine
	Joe. Simpson				New mine

DOUGLAS

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Platte Canon	Platte Canon Fuel & Power Co., Denver		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad connections	Remarks
.....	.....	Fan	.....	C. & S.....	Reopened

DELTA

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
King	Juanita Coal & Coke Co., Pueblo		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad connections	Remarks
.....	.....	.....	.....	.....	D.& R.G...New opening

EL PASO

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Curtis	Curtis Coal Mining Co., Colorado Springs		
Rapson No. 2	Rapson Coal Mining Co, Colorado Springs		
Danville	Pike's Peak Fuel Co., Colorado Springs		
Pikeview	Pike's Peak Fuel Co., Colorado Springs		
Austin Bluffs	Keystone Fuel Co	C. B. Wade	
Williamsville	Monument Valley Coal Co., Colorado Springs		
Tudor	Tudor Coal Co., Colorado Springs		
Patterson	A. Patterson, Colorado Springs		
Franceville	J. M. Cell, Fountain		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad connections	Remarks
.....	Ralph Wooden	Fan	22,000	S. F.	.....
.....	Ralph Wooden	Fan	32,000	R. I.	.....
.....	James Comesky	Fan	21,000	S. F.	.....
.....	P. L. Dixon	Fan	21,000	D. & R. G.	.....
.....	.....	Natural	.....	None	.....Reopened
.....	W. S. Cook	Furnace	.....	None	.....
.....	Hughes Tudor	Natural	9,000	None	.....
.....	Geo. Patterson	Fan	15,000	None	.....
.....	.....	Natural	.....	None	.....

FREMONT

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Brookside	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Rockvale	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Coal Creek	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Fremont	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Nonac	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Chandler	Victor Fuel Co., Denver		W. J. Murray
Radiant	Victor Fuel Co., Denver		W. J. Murray
Magnet	Rocky Mountain Fuel Co., Denver	E. E. Shumway	
Beacon	Great Western Coal Co., Canon City		
Royal Gorge	Royal Gorge Coal & Fire Clay Co., Canon City		
Florence	Florence Coal Co., Florence	M. E. Lewis	
Horseshoe	A. L. Morgenstein, Coal Creek		
Walsh	Walsh & Oliver, Coal Creek		
Cowan	Cowan Coal Co., Coal Creek		
Peanut	Williamsburg Slope Coal Co., Williamsburg		
Williamsburg Slope	Williamsburg Slope Coal Co., Williamsburg		
Bluffs Springs	Primrose-Rugby Coal Co.		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad connections	Remarks
Joe Ball	H. Davis	Fan	24,800	Santa Fe	
Joe Ball	Henry John	Fan	48,000	Santa Fe	
Joe Ball	Ben Beach	Fan	30,780	D. & R. G.	
Joe Ball	D. Griffiths	Fan	27,000	D. & R. G.	
Joe Ball	B. L. Davis	Fan	11,800	Santa Fe, D. & R. G.	
	G. H. Williams	Fan	20,000	D. & R. G.	
	Henry Donnelly	Furnace	31,000	Santa Fe	
	J. W. Canty	Fan	24,990	Santa Fe	
	J. W. Lowry	Fan	18,000	D. & R. G.	
	L. J. Wood	Natural	6,000	Santa Fe	
	H. Locke	Furnace	5,000	None	
	A. L. Morgenstein	Furnace	7,500	None	
	M. M. Walsh	Furnace	6,559	Santa Fe	
	Chas. Cowan, Jr.	Furnace	8,541		
	S. P. Smith	Natural	7,500	Santa Fe	
	S. P. Smith	Natural	5,994	Santa Fe	
		Natural	6,551		

GARFIELD

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Coryell	Coryell Mine Leasing Co., Newcastle	J. W. Cummins Pres.	W. E. Parnell
Midland	Rocky Mountain Fuel Co., Denver	E. E. Shumway, Pres.	
Pocahontas	Rocky Mountain Fuel Co., Denver	E. E. Shumway, Pres.	
South Canon	South Canon Coal Co., Denver	W. B. Lewis	
Keystone	Meese & Dalrymple, Newcastle		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad connections	Remarks
.....	Ira Chadwick	Fan	35,000	C. M.	
.....	Chas. I. Coryell	Fan	15,000	C. M.	
.....	Chas. Moerdink	Fan	12,600	C. M.	
.....	Robert Brown	Fan	55,000	C. M.	
.....	.....	Fan	.....	D. & R. G..... C. M.	

GUNNISON

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Crested Butte	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Anthracite	Colorado Fuel & Iron Co.	John T. Kebler	
Floresta	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Alpine	Continental Fuel Co., Mt. Carbon		
Somerset	Utah Fuel Co., Somerset		
Silver Brook	Pueblo Fuel & Mining Co., Colorado Springs		
Porter	Pueblo Fuel & Mining Co., Colorado Springs		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad connections	Remarks
J. P. Thomas	Robert McAlister	Fan	46,800	D. & R. G.	
J. P. Thomas	J. H. Funder	Fan	25,000	D. & R. G.	
J. P. Thomas	J. H. Funder	Fan	31,800	D. & R. G.	
	Jos. Watson	Fan	40,800	C. & S.	
	Gus Goodart	Fan	53,000	D. & R. G.	
	Ira A. Little	Fan	12,000	D. & R. G.	
	Ira A. Little	Furnace	7,111	D. & R. G.	

HUERFANO

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Pictou	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Robinson	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Walsen	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Rouse	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Hezron	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Maitland	Victor Fuel Co., Denver		W. J. Murray
Pryor	Union Coal & Coke Co., Denver	J. W. Bowen	
Champion	Union Coal & Coke Co., Denver	J. W. Bowen	
Toltec	Northern Coal & Coke Co., Denver	Leased by Fruith & Autrey	
Midway	The H. C. Nicholls Coal Co., Pryor		
Rugby	Rugby Coal Mining Co., Denver	J. M. League	
Sweet	Silver State Coal Co., Denver		
Sunnyside	Sunnyside Coal Mining Co., Denver	M. W. Strong, Pres.	
Huerfano	Huerfano Coal Co., Denver		
Pinon No. 1	Rocky Mountain Fuel Co., Denver	E. E. Shumway, Pres.	
Pinon No. 2	Rocky Mountain Fuel Co., Denver	E. E. Shumway, Pres.	
Occidental	Great Western Fuel Co., Denver		
Korte	G. F. Korte, Walsenburg		
Black Canon	Cucharor Coal Co., Walsenburg		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
Joe Ball	George Phipps	Fan	50,000	D. & R. G.	
Joe Ball	R. K. Graham	Fan	32,500	D. & R. G.	
Joe Ball	R. K. Graham	Fan	33,600	D. & R. G.	
Joe Ball	M. T. Brennan	Fan	33,000	D. & R. G.	
Joe Ball	J. P. Breen	Fan	12,500	D. & R. G.	
	H. J. Elliott	Fan	15,500	C. & S., D. & R. G.	
	Charles Beuchat	Fan	25,000	C. & S., D. & R. G.	
	W. A. Cathorn	Fan	18,000	C. & S., D. & R. G.	
		Fan	30,000	C. & S., D. & R. G.	
	H. C. Nicholls	Fan	18,000	D. & R. G.	
	L. C. Miller	Fan	17,000	C. & S., D. & R. G.	
	John McDowell	Furnace	8,000		
	F. R. Henneson	Fan	28,000	C. & S., D. & R. G.	
	William O. Van Etten	Fan	15,500		
	E. H. Whiles	Furnace	7,000	D. & R. G.	
	E. H. Whiles	Furnace	6,850	D. & R. G.	
	Thomas F. Booth	Natural	14,080		
				None	
					Shut down

JEFFERSON

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Leyden	Leyden Coal Co., Denver	S. M. Perry	

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
.....	J. G. Perry	Fan	40,000	D. & N. W.	.....

LAS ANIMAS

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Primero	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Starkville	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Sopris	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Engle	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Berwind	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Tobasco	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Tercio	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Cuatro	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Quinto	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Hastings No. 2	Victor Fuel Co., Denver	W. J. Murray	
Delagua	Victor Fuel Co., Denver	W. J. Murray	
Gray Creek	Colorado Fuel Co., Denver	W. J. Murray	
Bowen	Victor Fuel Co., Denver	W. J. Murray	
Majestic	Continental Fuel Co., Denver		
Bloom	Jeffreyes Coal & Mining Co., Trinidad		
Brodhead	Las Animas Coal Co		
La Belle	Rocky Mountain Fuel Co., Denver	E. E. Shumway, Pres.	
Piedmont	Rocky Mountain Fuel Co., Denver	E. E. Shumway, Pres.	
Francisco	Rocky Mountain Fuel Co., Denver	E. E. Shumway, Pres.	
Primrose	Primrose Coal Co., Rugby		
Green Canon	Green Canon Coal Co., Denver	H. Van Mater, Pres.	
Suffield	Green Canon Coal Co., Denver	H. Van Mater, Pres.	
Black Diamond	Cedar Hill Coal & Coke Co., Denver	H. W. Anderson	
Greenville	Cedar Hill Coal & Coke Co., Denver	H. W. Anderson	
Ludlow	Huerfano Coal Co., Denver		
Forbes	Chicosa Fuel Co., Majestic		
Valley	Valley Fuel Co., Denver		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
Robert O'Neil	Wm. Morgan	Fan	108,500	C. & W.	
Robert O'Neil	G. J. Johnson	Fan	22,900	Santa Fe	
Robert O'Neil	J. S. Thompson	Fan	34,500	C. & S.	
Robert O'Neil	Alex. Jacobs	Fan	36,000	D. & R. G.	
Robert O'Neil	Wm. McDermott	Fan	90,000	C. & S.	
Robert O'Neil	J. G. Young	Fan	26,000	C. & S.	
Robert O'Neil	James Wilson	Natural	19,000	C. & W.	
Robert O'Neil	James Wilson	Furnace	18,000	C. & W.	
Robert O'Neil	A. Alexander	Furnace	9,000	C. & W.	
	D. E. Davis	Fan	100,000	C. & S., D. & R. G.	
	James Cameron	Fan and furnace	84,000	C. & S.	
	B. J. Matteson	Fan	40,800	C. & S.	
	D. O. Pritchard		41,000	C. & S.	
J. Watson	O. C. Cook	Fan	37,000	C. & S.	
	George Jeffreyes	Natural	7,000	None	
		Fan	18,000	C. & S., D. & R. G.	
	Thos. Hutchinson	Furnace	10,000	None	Product goes to Sopris.
	John Hutchinson	Fan	60,000	C. & W.	
	Thos. Hutchinson	Furnace	15,000	Trinidad Electric	
	Robert Wyper	Fan	9,000	C. & S., D. & R. G.	
	John McIlwee	Fan	20,000	C. & S., D. & R. G.	
	John Tweeddale	Furnace	16,000	C. & S.	
Joe Smith		Fan		D. & R. G., C. & S.	
Joe Smith	H. T. Tennant	Fan	40,000	C. & S.	
	Thos. J. Ashe	Furnace	8,800		
	Joseph Cox	Furnace	5,000	C. & S., D. & R. G.	
		Fan	30,000	C. & W., C. & S.	Shut down

LAS ANIMAS

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Stevens	J. J. Abercrombie & Co., Trinidad		
Jewel	Northern Coal & Coke Co., Denver	Leased to the Globe Coal Co.	
Southwestern	Northern Coal & Coke Co., Denver	Leased to the Southwestern Fuel Co.	
Rapson No. 1	Rapson Coal Mining Co., Colorado Springs		
Sunlight	Trinidad Coal Co., Trinidad		
Reilly Canon	Carbon Coal & Coke Co., Trinidad	F. Guiterman	

COUNTY—Concluded.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad connections	Remarks
.....	.....	Natural	6,000	None	.....
.....	Geo. M. Tombling	Furnace	4,000	C. & S.....	.....
.....	.....	Furnace	5,000	C. & S.....	.....
.....	Ralph Wooden	Furnace	7,000	C. & S.....	.....
.....	.....	.....	.....	.....	.....
.....	F. P. Bayles	.....	.....	C. & W.....New mine	

LA PLATA

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Porter	Porter Fuel Co., Durango		
Hesperus	Porter Fuel Co., Durango		
City	Gold King Consolidated Mines Co., Durango		
Champion	Gold King Consolidated Mines Co., Durango		
Perin's Peak	Calumet Fuel Co., Durango		
Ute	Ute Fuel Co., Durango		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
.....	W. J. Gifford	Fan	35,000	P. G. S.....	.....
.....	W. J. Gifford	Fan	15,000	R. G. S.....	.....
.....	Geo. C. Logan	Natural	6,000	D. & R. G.....	.....
.....	Geo. C. Logan	Natural	5,000	D. & R. G.....	.....
.....	M. Beveridge	Furnace	17,000	R. G. S.....	.....
.....	.....	.....	.....	R. G. S...Closed down	

MESA

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Book Cliff	Book Cliff Railroad Co., Grand Junction	W. S. Phillips	
Cameo	Grand Junction Mining & Fuel Co.	John McNeil, Denver	
Stokes	Walter Stokes, Palisade		
Palisade	Palisade Coal & Supply Co., Palisade		
Riverside	Jamieson Bros., Palisade		
Wearing	William Giffen, Fruita		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
.....	F. E. Sanford	Natural	.....	Book Cliff	.....
.....	John O'Neil, Jr.	Natural	.....	D. & R. G.	.....
.....	Walter Stokes	Natural	.....	None	.....
.....	F. Rowley	Natural	.....	C. M.	.....
.....	H. H. Jamieson	Furnace	.....	None	.....
.....	.....	Natural	.....	None	.....

MONTEZUMA

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Mancos	Mancos Fuel Co., Mancos	G. S. Spencer	

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
.....	.....	Tunnel	.....	D. & R. G.	.....

PITKIN

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Spring Gulch	Colorado Fuel & Iron Co., Denver	John T. Kebler	
Coal Basin	Colorado Fuel & Iron Co., Denver	John T. Kebler	

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
J. P. Thomas	Tim Tinsley	Fan	40,500	C. M.	
J. P. Thomas	J. W. Allen	Fan	94,000	C. R.	

ROUTT

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Oak Creek	Oak Hills Coal Co., Denver	S. M. Perry	

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
J. G. Perry				D. & N. W.	New mine

WELD

Name of Mine	Name and Address of Operator	General Mgr.	General Supt.
Lehigh	Northern Coal & Coke Co., Denver	J. D. Skinner	J. C. Williams
Whitehouse	John Alderson & Son, Erie		
Reliance	Woolley Bros., Erie		
Washington	David Brimble, Erie		
Eureka	Eureka Coal Co., Longmont		
Lister	Hygienic Ice & Coal Supply Co., Erie		
Shamrock	Shamrock Coal Co., Erie		
Davies	Harding Bros. & Harvey, Longmont		
Advance No. 1	Advance Coal Mining Co., Fort Lupton	N. W. Spangler	
Northwestern	King Coal Co., Denver		
Golden Ashe	Consolidated Coal & Coke Co., Denver		

COUNTY.

Division Supt.	Local Supt.	Mode of Ventilation	Volume of Air in Cubic Ft. Per M.	Railroad Connections	Remarks
Henry Denman		Fan	11,461	U. P.	
	John Alderson	Fan	7,500	None	
	Phineas D. Woolley	Fan	12,000	U. P.	
		Fan	11,520	U. P.	
	T. D. McKean	Natural, fan when needed		None	
	Chas. E. Duncan	Fan	21,000	U. P.	
	James Brennan	Steam jet	4,380	None	
	W. D. Cannon	Fan	9,000	None	
		Fan	16,000	None	
	A. J. Vivian	Fan	15,000	U. P.	
	Frank S. Davis	Fan	14,600	U. P.	

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 mines 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 15,000 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 15,000 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 appropriate any adjoining land for that purpose, and for approach thereto, and shall be governed in his proceedings in appropriating such land by the provisions of law in force providing for the appropriation of private property by corporations, and such appropriation may be made whether he is a corporator or not; but no land shall be appropriated under the provisions of this act until the court is satisfied that suitable premises can not be obtained by contract upon reasonable terms. Escapement shaft or other communication with a contiguous mine, as aforesaid, shall be constructed in connection with every vein or stratum of coal worked in such coal mine or colliery, as provided herein.

Sec. 3. In all cases where the human voice can not be distinctly heard, the owner or agent shall provide and maintain a metal tube from top to the bottom of the slope or shaft, or a telephone connection suitably adapted to the free passage of sound, through which conversation may be held between persons at the bottom and at the top of the shaft or slope; also, the ordinary means of signaling to and from the top and bottom of the shaft or slope; and in the top of every shaft shall keep an approved safety gate and an approved safety catch, and sufficient cover overhead on every carriage used for lowering and hoisting persons; and the said owner or agent shall see that sufficient flanges or horns are attached to the sides of the drum of every machine that is used for lowering and hoisting persons in and out of the mine, and also that adequate brakes are attached thereto; the main link attached to the swivel of the wire rope shall be made of the best quality of iron, and shall be tested by weights satisfactory to the Inspector of Mines of the State; and bridle 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, prop-

erly filled, and forward the same by mail to said Mine Inspector, a copy of which shall be filed at the office of the coal company, subject to inspection by miners.

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

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

Sec. 7. All boilers used in generating steam in and about coal mines and collieries shall be kept in good order, and the owner or agent, as aforesaid, shall have said boilers examined and inspected by a competent boiler maker, or other well qualified person, as often as once every six months, and the result of such examination shall be certified, in writing, to the Mining Inspector; and every steam boiler shall be provided with a proper steam gauge, water gauge and safety valve; and all underground, self-acting or engine planes, or gangways, on which coal cars are drawn and persons travel, shall be provided with some proper means of signaling between the stopping places and the ends of said planes or gang-ways; and sufficient places of refuge, at the sides of said planes or gangways, shall be provided, at intervals of not more than fifty feet apart; and there shall be cut, in the side of every hoisting shaft, at the bottom thereof, a traveling-way, sufficiently high and wide to enable persons to pass the shaft, in going from one side of the mine to the other, without passing over or under the cage or hoisting apparatus.

Sec. 8. Whenever loss of life, or serious personal injury, shall occur by reason of any explosion, or of any accident whatsoever, in or about any coal mine or colliery, it shall be the duty of the owner of 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 such miners, by himself, or two or more persons whom he may appoint for that purpose. The owner, agent, or manager shall afford every necessary facility for making such inspection and measurement; but the said miners shall not in any way interrupt or impede the work going on in the mine at the time of such inspection and measurement.

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

Sec. 11. In case any owner or agent disregards the requirements of this act, any court of competent jurisdiction may, on application of the Inspector, by civil action in the name of the State, enjoin or restrain the owner or agent from working or operating such mine with more than twelve miners underground during each twenty-four hours, until it is made to conform with the provisions of this act. And such remedy shall be cumulative, and shall not take the place of or affect any other proceedings

against such owner or agent, authorized by law for the matter complained of in such 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 ex-

perience in the working of coal mines of Colorado, and five years of practical experience in the working of coal mines in the United States, and have a practical knowledge of mining engineering, and of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of mines, particularly fire-damp. The board of examiners shall receive six dollars per day, and same mileage as is allowed to members of the Legislature, to be paid out of the State treasury, upon the filing of the certificates of the examining board in the office of the Secretary of State, as hereinbefore provided. As often as vacancies in said office of Inspector of Mines shall occur, by death, resignation or malfeasance in office, which shall be determined in the same manner as in the case of any other officer of the State government, the Governor shall fill the same, by appointment, for the unexpired term, from the names on file in the office of the Secretary of State, as hereinbefore mentioned, as having passed examination. On January 1, A. D. 1887, and every four years thereafter, the Governor shall appoint one reputable mining engineer, of known ability, and shall notify the judges of four of the judicial districts of the State, within which coal mines are being operated, to each appoint one reputable coal miner, of known experience and practice, from their respective districts, and the five so appointed shall constitute a new board of examiners, whose duties, term of service and compensation shall be the same as those provided for by this section; and from the names that may be certified by them, the Governor shall appoint the Inspector of Mines provided for in this act. Nothing in this act shall be construed to prevent the re-appointment of any Inspector of Coal Mines. The Inspector of Coal Mines shall receive for his services an annual salary of two thousand dollars, and ten cents per mile mileage for all distances traveled in the discharge of his official duties, to be paid monthly by the State Treasurer; and said Inspector shall reside in the State, and shall keep an office at the Capitol, or other building, in which the offices of the State are located. Each Inspector is hereby authorized to procure such instruments, and chemical tests, and stationery, from time to time, as may be necessary to the proper discharge of his duties under this act, at the expense of the State, which shall be paid by the State Treasurer, upon accounts duly certified by him and audited by the proper department of the State. All instruments, plans, books, memoranda, notes, etc., pertaining to the office, shall be the property of the State, and shall be delivered to their successors in office.

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

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

Sec. 17. The Inspector of Coal Mines, and his deputy, shall devote the whole of their time to the duties of their office. It shall be the duty of the Inspector, or his deputy, to enter into and thoroughly examine all coal mines in the State in which more than ten men are employed, at least once each quarter, to see that all the provisions of this act are observed and strictly carried out, and the Inspector, or his deputy, or both, may enter, inspect and examine any coal mine in the State, and the works and machinery belonging thereto, at all reasonable times, by night or day, but so as to not unnecessarily obstruct or impede the workings of the mine; and the owner, or any agent of such mine, is hereby required to furnish the means necessary for such entry and inspection. The Inspector shall make, to the Governor of the State, a biennial report, which shall show the number of coal mines and development 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 not to be 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 holes, and where gob-fires or spontaneous combustion are known or even suspected to exist, a careful inspection shall be made daily of the workings by the mine boss or another competent person, and if an increase in temperature be localized in any part of the gobs or other places, prompt action shall be taken to remove the heated gob or debris, or extinguish the fire by water or other contrivance; but if the fire has already reached such proportions that it is impossible to extinguish it in that way, then it shall be the duty of the superintendent, or mine boss in the abesnce 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 conect 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 clevis 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.

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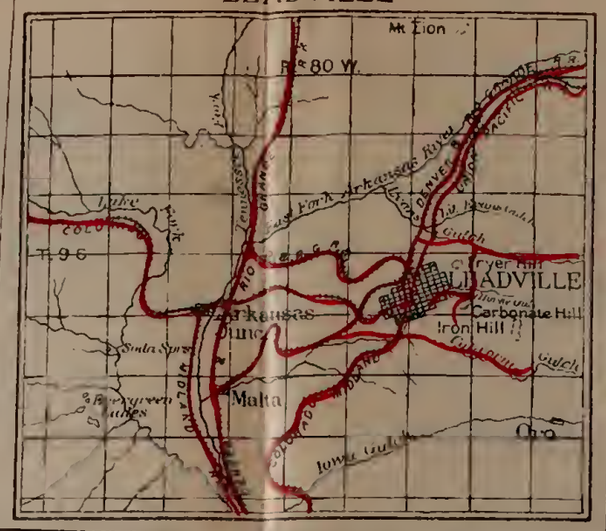
Map showing coal and metaliferous areas in Colorado.



MAP OF
STATE OF C

SHOWING T

COAL AND METALL

1907

Scale: 1 Inch–12

THE SMITH-BROOKS CO., ENGRAVERS

THE
OLORADO
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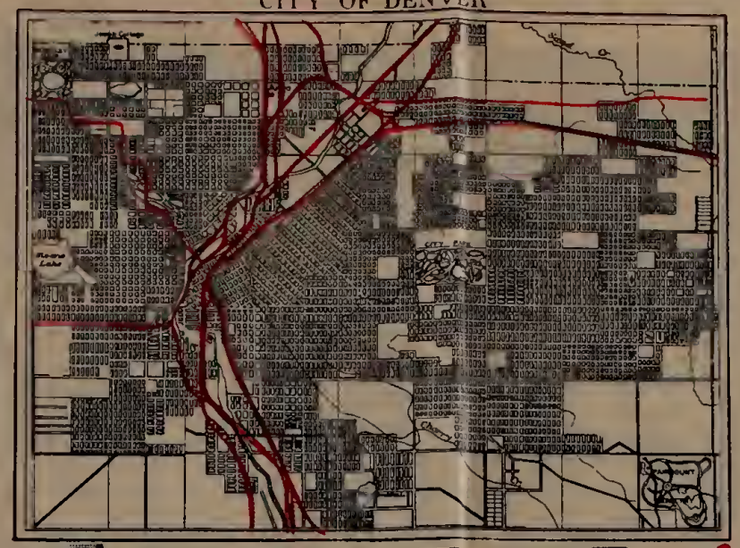
IFEROUS AREAS

Miles.
30 40 50 STAT. MILES.

ND PRINTERS, DENVER.

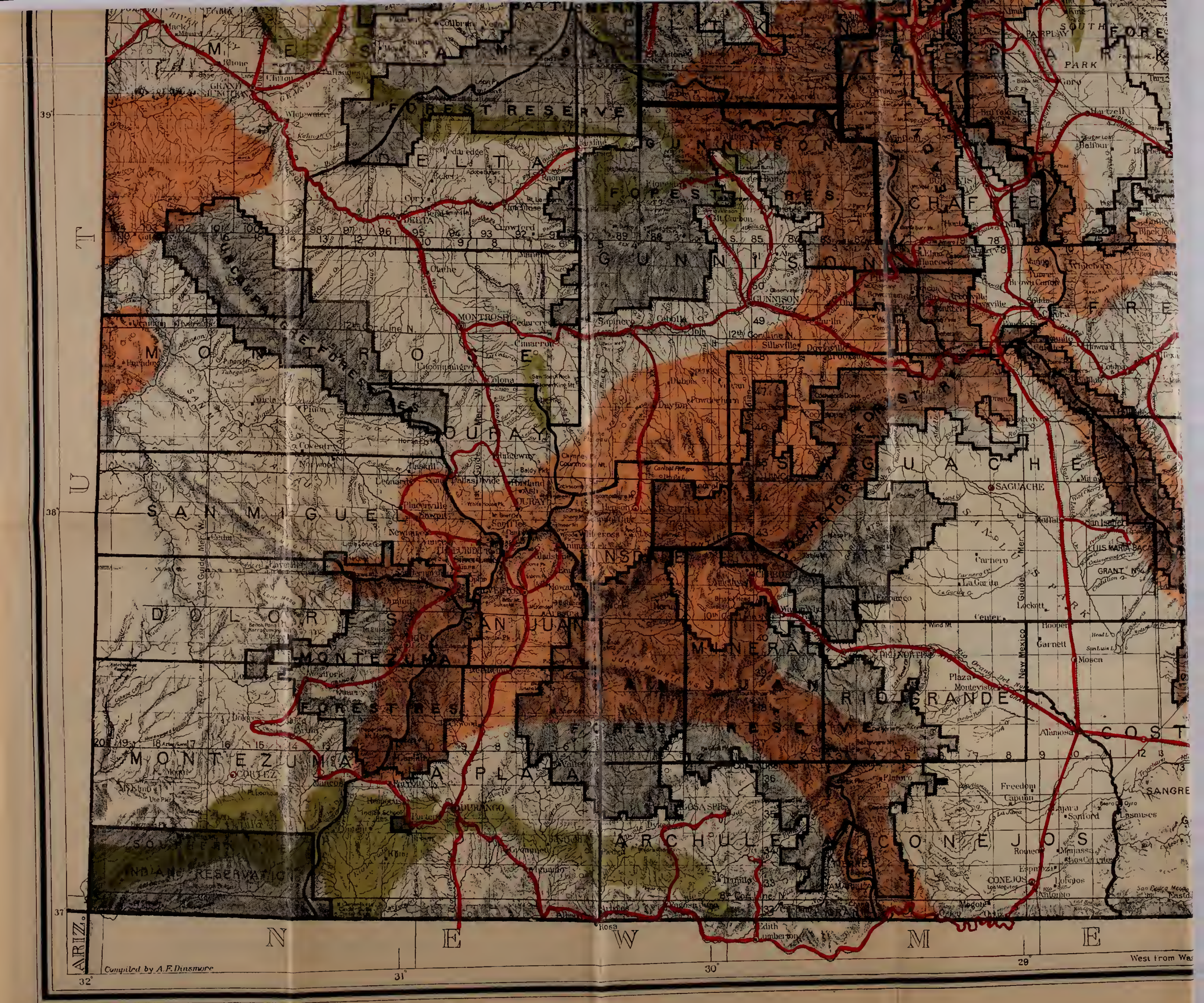
CITY OF DENVER



CRIPPLE CREEK

Greenwich 105° 104° 103° 102°

I N G N E B R A S K A 41°


FOREST RESERVE
DELTA
GUNNISON FOREST RES.
GUNNISON
CHAFFEE
SOUTH PARK
FOREST RESERVE
UNCOMPAHGRE FOREST RES.
MONTROSE
OURAY
SAN MIGUEL
DOLORES
SAN JUAN
MONTEZUMA FOREST RES.
MONTEZUMA
LA PLATA
SAN JUAN FOREST RESERVE
MINERAL
RIO GRANDE
SAGUACHE
COCHETOPA FOREST RES.
SAN LUIS PARK
ARCHULETA
CONEJOS
COSTILLA
FREMONT
SOUTHERN UTE INDIAN RESERVATION
UTAH
NEW MEXICO
ARIZ.
GRAND JUNCTION
DELTA
MONTROSE
GUNNISON
SAGUACHE
OURAY
TELLURIDE
SILVERTON
DURANGO
CORTEZ
DEL NORTE
ALAMOSA
CONEJOS
39°
38°
37°
32°
31°
30°
29°
West from Washington
Compiled by A. F. Dinsmore

DOUGLAS

ELBERT

EL PASO

LINCOLN

CHEYENNE

KIOWA

PUEBLO

OTERO

BENT

PROWERS

HUERFANO

LAS ANIMAS

OKLAHOMA

Traced and Lettered by Wm. Bauman Jr.

Abbey
Saltcreek
Crow
Graneros
ST
Rye
Greenhorn
Apache
Apache Cr.
ST VRAIN
GRANT Nº6
Huerfano
HUERFANO PARK
Gardner
Malachite
Talpa
St.Marys
Badito
Strong
Huerfano Butte
Vigil & St Vrain Grant
H U E R F A N O
Sheep Mt.
Maitland
Pictou
Walsen
WALSENBURG
Cucharas
Muriel
Dike Mt.
Hezron
Pryor
Rouse
Cucharas R.
Rugby
Aguilar
Apishapa
Garland
La Veta
66
68
72
Delagua
Gulnare
Tabasco
Berwind
Majestic
PARK PLATEAU
Hicks
DE CRISTO
TRINIDAD
Primero
Madrid
Weston
Torres
Cuatro
Segundo
Mayville
Stonewall
Saco
South Fork
X
I
28°