

Report of the
Coal Mine
Inspector

FOR THE STATE OF UTAH,

FOR THE YEAR

1896

REPORT

OF THE

Coal Mine Inspector

FOR THE STATE OF UTAH,

From April 6th to December 31st, 1896.

SALT LAKE CITY:
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1897.

REPORT

OF THE

State Coal Mine Inspector.

OFFICE OF STATE COAL MINE INSPECTOR,
SALT LAKE CITY, UTAH,
February 1st, 1897.

*To His Excellency, Heber M. Wells, Governor of the
State of Utah:*

In obedience to the requirements of the act of the Legislature of the State of Utah, 1896, entitled "An Act for the protection of the Lives of Coal Miners, the Appointment of a Coal Mine Inspector for the State, defining the Duties of said Inspector, Mine Owners, Lessees and Operators, and prescribing Penalties for a violation of the Provisions of this Act, and repealing all inconsistent Acts," I have the honor to submit herewith my annual report covering the portion of the year 1896, from the date of my appointment on April 6th, to the close of said year.

Prior to the admission of Utah into the Union, the duties of my position were performed by an officer known as "United States Inspector of Coal Mines for Utah," whose office was established by an Act of Congress entitled, "An Act for the protection of the Lives of the Miners in the Territories."

While the duties imposed upon that office were efficiently performed in most instances, the fact that the last incumbent of that position under Territorial

government failed entirely to compile annual reports covering the years of his incumbency, together with the fact that he left no reliable data, from which I could obtain necessary information, has compelled me to resort to the books and records of the coal producers to obtain much of the statistics embraced in my first annual report. While this has caused considerable extra labor, it was nevertheless absolutely necessary, in order to compile anything like a comparative statement of the products of the classes of mines inspected during the year 1896, as compared with the years immediately preceding. I am gratified, however, that in seeking this information, the fact has appeared that while the products of the coal and hydrocarbon mines have shown such a marked increase during the year just ended, this increase has not been attended with the casualties and accidents in proportion to the increased production.

In some instances I have been unable to obtain exact and accurate statements of the output, but these were the exceptions and embraced only a few of the small producers. In such cases, I have with all obtainable information, made approximate estimates of the products, but with reference to the coal companies and large producers, I cordially commend the cheerfulness, not only with which they have furnished me with an account of their production, but with which they have otherwise assisted me in my labor and complied with all suggestions which the duties of my position required me to make to them. A few of the large producers have with commendable forethought and sagacity, begun and continued the operation of their properties upon intelligent and scientific methods, and their reward is apparent, not only in their present output, but in the present condition and future capacity of their great properties. I regret to say, however, that in very many instances, most primitive methods in opening the mines have been adopted. This is the result of an endeavor to increase the immediate product and decrease immediate outlay, regardless of future operation, and exhibits that ever existing propensity to kill the goose that lays the golden egg.

In many cases, even the most casual observance of

the elementary principles of mining or the shallowest knowledge of the geological conditions of the particular property would dictate a course directly opposed to that pursued; but the promise of an immediate reward, however small, seems to outweigh other considerations, and the result is that the mine is practically valueless at the time it should be at the very high tide of prosperity and profit.

The present immense productions and ultimate possibilities of the great metaliferous mines of Utah are matters of common knowledge and everyday talk, but there are comparatively few, even of our own citizens, who appreciate the extent and value of our coal and hydro-carbon deposits; indeed we can scarcely comprehend the vast possibilities which a judicious appropriation of our great natural advantages insures. Nature has not only locked and combined within the "Mountain Walled Treasury of the Gods," mineral wealth equal to, if not surpassing, all other states or localities, but has deposited at our doors hydro-carbon wealth unknown to any other portion of the world.

With the production of this great wealth, the utilizing of our inexhaustible iron deposits and the economical production of our metaliferous ores, all dependent, in a greater or less degree, upon our coal fields, who can measure the future operations of our great coal mines?

Permit me to say that, though, early in the year, there was some apprehension regarding the effect of the act of March 30th, 1896, or which is commonly known as the "eight hour law," I am gratified to record that the provisions of this act, as applied to the coal producers and their employes, have wrought none of the hardships which some had predicted; on the contrary, the relations between the employers and employes have been singularly free from friction or disturbance, and while wages have not been high, employment has been uniformly steady and fairly remunerative. Not a strike, lockout, nor suspension on account of disagreement as to wage rates has occurred during the entire year, and the indications are that the next year will witness more extended operations in the coal industry, equally free from strife or disturbance.

Especially has the wisdom of the act prohibiting the employment of persons of tender years in certain classes of work been made apparent. In conclusion I may add, that the act of April 5th, 1896, creating the office of Coal Mine Inspector and prescribing the duties thereof, seems to have been wisely considered, and a practical application of its provisions has developed no necessity for radical changes or amendments.

Very respectfully,
 THOMAS LLOYD,
 State Coal Mine Inspector.

STATEMENT OF COAL CASH ENTRIES
 IN THE SALT LAKE CITY LAND OFFICE FOR EACH YEAR
 ENDING DEC. 31, SINCE ITS OPENING IN 1869.

Year.	No. Fillings.	Acres.	Amount.
1874	1	80.00	\$ 800.00
1875	3	216.76	7,535.00
1876	1	122.40	1,224.00
1877	4	480.00	4,800.00
1878	1	160.00	3,200.00
1879	4	792.07	7,919.90
1881	34	5,160.52	58,405.20
1882	16	2,260.04	41,235.60
1883	7	755.18	11,466.50
1884	1	120.00	1,200.00
1885	1	52 44	524.00
1886	2	200.70	2,007.00
1888	2	278.40	5,568.00
1889	3	442.47	7,249.40
1890	12	1,801.70	29,622.90
1891	12	1,635.94	29,918.80
1892	5	720.00	12,800.00
1893	3	364.54	7,290.80
1894	5	740.00	6,560.00
1895	5	606.65	8,933.00
1896	3	355.51	7,110.00
	<u>125</u>	<u>17,345.25</u>	<u>\$255,370.10</u>

STATEMENT OF COAL FILINGS ENTERED

IN THE SALT LAKE CITY LAND OFFICE FOR EACH YEAR
ENDING DEC. 31, SINCE ITS OPENING IN 1869.

Year.	No. Filings.	Acres.	Amount.
1873	6	840	\$ 18.00
1874	65	10,040	195.00
1875	120	17,980	360.00
1876	73	11,200	219.00
1877	20	2,980	60.00
1878	19	2,400	57.00
1879	18	2,680	54.00
1880	123	18,960	369.00
1881	98	13,840	294.00
1882	99	15,240	297.00
1883	40	5,520	120.00
1884	23	3,240	69.00
1885	15	2,400	45.00
1886	21	3,240	63.00
1887	29	4,320	87.00
1888	153	23,640	459.00
1889	90	14,040	270.00
1890	78	11,800	234.00
1891	45	6,400	135.00
1892	41	6,640	123.00
1893	60	8,880	180.00
1894	40	6,640	120.00
1895	51	7,440	153.00
1896	31	3,640	93.00

 PRODUCTION OF COAL IN UTAH

FROM 1876 TO 1896 INCLUSIVE.

Year.	Amount.
1876	50,400
1877	50,400
1878	67,200
1879	225,000

Year.	Amount.
1880	225,000
1881	225,000
1882	250,000
1883	250,000
1884	250,000
1885	213,120
1886	200,000
1887	180,021
1888	259,501
1889	236,651
1890	318,159
1891	371,045
1892	361,314
1893	418,049
1894	447,276
1895	472,958
1896	503,243

Total production since 1876, 2,892,044

PRODUCTION OF UTAH COAL MINES, 1896.

Name of Mine.	Operated by.	Tons.
Castle Gate	Pleasant Valley Coal Co.	185,319
Cullen	Grass Creek Terminal Ry. Co.	10,925
Edmunds	Edmunds Bros.	835
Fairview	Ezra D. Jones, Lessee	750
Hopkins	Hopkins Coal Co.	5,053
Kimball	O. G. Kimball	471
Pleasant Valley	Union Pacific Coal Co.	55,113
Thomas	Sterling Coal & Coke Co.	1,200
Wasatch	Weber Coal Co.	54,424
Wilson	Wilson Bros.	*5,000
Winter Quarters Nos. 1 and 2	Pleasant Valley Coal Co.	122,562
From all other sources,	Various individuals and companies	61,591
Total production in 1896.		503,243

*Estimated.

EXHIBIT

OF THE COAL, COKE AND ASPHALTUM PRODUCTION,
IMPORTS, EXPORTS AND CONSUMPTION IN
UTAH, FOR 1896.

	Bituminous Coal.	Anthracite.	Coke.	Asphaltum.
Production in Utah.....	503,243		20,448	4,153
Importations into Utah.	263,834	12,351	20,002	
Totals.....	767,077	12,351	40,450	4,153
Exportations from Utah ..	63,871			
Total Consumption in Utah..	703,206	12,351	40,450	4,153

MINES EMPLOYING MORE THAN SIX MEN.

Name of Mine.	Kind.	Operated by	P. O. Address.
Castle Gate.....	Drift.	Pleasant Valley Coal Co.	Salt Lake City.
Cullen.....	Slope.	Grass Creek Coal Co.	Salt Lake City.
Edmunds.....	Slope.	Nathaniel Edmunds.	Wales, Utah.
Hopkins.....	Slope.	Hopkins Coal Co.	Coalville.
Pleasant Valley.....	Drift.	Union Pacific Coal Co.	Scofield.
Wasatch.....	Slope.	Weber Coal Co.	Coalville.
Wilson.....	Slope.	Wilson Bros.	Coalville.
Winter Quarters No. 1.....	Drift.	Pleasant Valley Coal Co.	Salt Lake City.
Winter Quarters No. 2.....	Drift.	Pleasant Valley Coal Co.	Salt Lake City.

MINES EMPLOYING LESS THAN SIX MEN.

Name of Mine.	Kind.	Operated by	P. O. Address.
Allen Hallon.....	Shaft.	Chalk Creek Coal Co.	Salt Lake City.
Aberdeen.....	Drift.	Cove Canyon C. & C. Co.	Price.
Bear Canyon.....	Drift.	Don C. Robbins.	Salt Lake City.
Church.....	Drift.	Grass Creek Coal Co.	Salt Lake City.
Coray.....	Drift.	Andrew Coray & Co.	Cedar City.
Deer Creek.....	Drift.	E. H. Cox & Co.	Huntington.
Deseret.....	Drift.	Deseret C. & C. Co.	Manti.
Dexter.....	Slope.	Lucy Dexter & Co.	Coalville.
Fairview.....	Drift.	Ezra D. James, Lessee.	Milburn.
Gomer Thomas.....	Slope.	Gomer Thomas	Coalville.
Griffiths.....	Drift.	Orangeville C. & C. Co.	Orangeville.
Kanarra.....	Drift.	S. J. Pollock.	Kanarra.
Kimball.....	Drift.	O. G. Kimball.	Scofield.
Pittsburgh.....	Drift.	Pittsburgh Coal Co.	Orangeville.
Thomas.....	Slope.	Sterling Coal & Coke Co.	Manti.
Williams.....	Slope.	Grass Creek Coal Co.	Salt Lake City.
Wood & Taylor.....	Drift.	Geo. W. Wood.	Cedar City.

NOTE:—Besides those enumerated above there are a number of openings and prospects, some of which are mentioned under the head of "Other Districts and Properties."

FATAL ACCIDENTS.

During the year, three fatal accidents have occurred in or about the mines of my jurisdiction, resulting in the death of four persons. The first of these occurred on July 28th, the second on November 18th, and the third on November 24th.

July 18th, 1896. On the morning of this date, Peter Jensen, a miner, was working in the extreme face of his room, in the Pleasant Valley Coal company's Castle Gate mine, and was engaged in picking down some coal which had not been entirely blown out by the shot of the previous evening, when a large rock, directly above, fell upon him, crushing him down. The rock was removed by the workmen in the immediate vicinity as soon as possible, but death ensued within fifteen or twenty minutes from the time the rock was removed.

On the same day an inquest was held by Coroner H. B. Asadoorian, when the following verdict was returned:

CASTLE GATE, Utah, July 28th, 1896.

State of Utah, }
 County of Carbon, } ss. Before H. B. Asadoorian,
 Castle Gate. } Coroner.

In this inquisition holden on the body of one Peter Jensen, who lays dead there, we the undersigned jurors on our oath declare and say that the deceased Peter Jensen came to his death by an accident caused by the fall of a rock in the Castle Gate Coal mine, and that there was no one to blame for the accident.

Signed:

HENRY WADE,
 ROBERT WILLIAMS, SR.,
 HENRY J. NELSON,
 Jurors.

November 18, 1896.

At about 4:20 o'clock p. m. of this date, William Duerdon, assistant dumper at the Pleasant Valley Coal company's Castle Gate mine, was killed by becoming entangled, in some unknown way, in the belt which propels the crushing rolls of the mine. The machinery had been stopped at four o'clock for the purpose of oiling. It had been customary when the engine would stop on the "Center," which was the case on this occasion, to start the same by hand. This is usually done by using iron bars to turn the two pairs of lower crushing rolls. It appears this had been done and the engine thus moved off the "center," so that it would start when the power should be applied. Three men, of whom deceased was one, had been using the bars to turn the rolls. The foreman of the chute, after calling out to the men to get out of the way, gave the engineer the signal to start, which was done. As the machinery started, the deceased, as has been stated, became entangled in the belt which drives the rolls at which he had been previously at work. The engine was quickly stopped, but death followed within one and one-half hours. An inquisition was held on the following day before Justice of the Peace J. H. Van Natta, when the following verdict was returned:

State of Utah,)
 Castle Gate Precinct,) ss.
 Carbon County:)

An inquisition holden at Castle Gate, in Castle Gate Precinct, Carbon County, State of Utah, on the 19th day of November A. D. 1896, before J. H. Van Natta, Justice of the Peace in Helper Precinct, Carbon County, State of Utah, upon the body of William Duerdon, there lying dead, by the jurors whose names are hereto subscribed. The said jurors upon their oaths do say that the said William Duerdon was accidentally killed in the crusher room of the Pleasant Valley Coal Company, in State, county and precinct

aforesaid, by falling between the belt and pulley wheel operating coal crusher.

Signed:

B. F. CAFFEY,
A. YOUNG, SR.,
J. A. HARRISON,
Jurors.

Attested:

J. H. VAN NATTA, Justice of the Peace,
Helper Precinct, Carbon County,
State of Utah.

November 19th, 1896.

November 24th, 1896.

At about 3:30 o'clock on the afternoon of this date, an explosion occurred in the Gilsonite-Asphaltum Company's mine, near Fort Du Chesne, by which two men, Andrew Garn and Charles Anderson, lost their lives, and while I have endeavored by all possible means to determine the immediate cause of the deplorable accident, I am still left to conjecture as to the means by which the inflammable material of the mine was ignited. The news of the accident reached me on the following morning, and on the same day I started for the mine, reaching there November 27th. I found the mine on fire, and the flames leaping out of several of the shafts. The gilsonite had been stoped from the 100-foot level to within about 15 feet of the surface. The substance above the stoping burned out, causing cave-ins, and rendered exploration of the particular portion in which the unfortunate men had been at work, impossible. By closing such openings as were approachable, we finally succeeded, on November 29th, in extinguishing the fire, and I went down into the mine, but was unable to approach the portion where the bodies were supposed to be, both on account of intense heat and because of the cave.

During the day of the accident, Andrew Garn had been at work on the lowest level, about 100 feet from the surface, and Charles Anderson on the level 50 feet above Garn. The explosion occurred about 3:30 p. m. It had been customary for the miners to begin sacking at about this hour, and it is possible that

both men were together, either at the 50-foot level or on the 100-foot level at the time of the explosion, or they may have been elsewhere in the mine. Several persons were near the mouth of the working shaft. They say they first heard a slight rumbling noise below, then saw a puff of smoke or dust emerge from the shaft; then came the noise of the explosion and the flames. But these facts furnish no definite information as to how the dust or the gilsonite first became ignited.

The miners had been furnished a large enclosed headlight lamp, and it had been the custom to suspend this some distance back from the working face.

From the evidence of the persons at the surface, it seems reasonable that there were two explosions, the first being slight and causing the rumbling noise and the puff of smoke which first issued from the shaft, the second being the greater explosion caused by the igniting of the inflammable material in the deeper recesses or more covered portion of the mine, where greater resistance was offered.

It is impossible to state whether the men were killed by one or the other of the explosions, or whether the immediate cause of death was by being burned or suffocated, or by a cave-in caused by the explosion.

By reference to my report elsewhere of this particular mine, it will be seen that I had called the attention of the management to some improvements necessary in the matter of ventilation and timbering, and I have been informed that these improvements had been made prior to the occurrence of this accident.

I append hereto a copy of that portion of the report forwarded me by the superintendent of the mines, relating to the particulars and cause of the accident.

The superintendent says:

“Cause not positively known, but supposition is that fire was started in some manner that it has not so far, been possible to ascertain, as the only men (2) working in the mine at that time, were killed, either by the explosion, or by suffocation, or by being burned.

“At present I can imagine but one way in which it is even probable the fire could have originated; that is by the breaking of a lamp by some violent force, such

as being struck by a pick, as the lamps were so constructed that they could not be broken by an ordinary fall or blow.

“Great precaution has been observed in clearing the mine of dust, both by providing strong air currents and by keeping a constant water supply for washing down the dust, for which purpose a team and man were continually employed. It was the duty of the miners to wash down the walls and timbers of their respective sections.

“It has, so far, been impossible to prosecute a search for the bodies of the two men on account of heat; when this can be done, it is possible some evidence bearing upon the cause of the accident may be discovered.”

NON-FATAL ACCIDENTS.

There were nine non-fatal accidents during the year 1896. Of these six occurred at the Pleasant Valley Coal Company's mine at Castle Gate, two at the same Company's Winter Quarters mines at Scofield, and one at the Union Pacific Coal Company's Pleasant Valley mine at Scofield.

May 21st, 1896. At six o'clock p. m. Alex Stewart, a driver in the Pleasant Valley Coal Company's mine at Castle Gate, was injured by being kicked by one of the mules. The mules were standing at the bottom of the 5th rise entry, waiting for the last trip. When the trip was nearly loaded, Stewart attempted to pass the mules to start, when he slipped and fell. One of the mules became frightened and kicked him twice; once on the shoulder and once on the arm just above the wrist, causing a fracture of the lower end of the radius.

June 6th, 1896. At 3:30 o'clock p. m., Mike Kuzma, employed by the Pleasant Valley Coal Company as assistant dumper at the Castle Gate mine, was injured on the trestle. In order to dump the cars it is

necessary to uncouple the same. While Kuzma was in the act of uncoupling two cars, Joseph Hamel, another employe, was pushing down five other cars which came in contact with the two cars Kuzma was uncoupling, causing them to run together. The right leg was caught between the cars, causing simple fracture of the leg.

June 2nd, 1896. At 3:30 o'clock p. m. of this date, John Stagg, a miner in the Pleasant Valley Coal Company's mine at Castle Gate, was working in room No. 16, at No. 1 dip, when he broke through to a slip, which fell over on him, causing a laceration of the face and contusion of the right side of the chest and shoulder.

June 19th, 1896. At about 2 o'clock p. m., at mine No. 2, Winter Quarters, of the Pleasant Valley Coal company, John F. Davis, timberman, was engaged with others renewing timbers and loading loose coal and rock on the main entry outside of mine rise. In attempting to remove some loose coal resting against the lags behind the timbers, he removed the support of the broken roof and a large piece of sandstone fell, striking him on the head, causing a double compound fracture of the lower jaw, laceration of the right temporal muscle and a severe scalp wound from the forehead down to two inches below the occipital protuberance on right side.

July 3rd, 1896. At 1:45 o'clock p. m., Vincent Puinod, a miner in the Pleasant Valley Coal Company's mine at Castle Gate, was coming out of the mine on the return air way. When he reached the crosscut leading on to the main entry at the outside back level switch, the outside main rope was pulling a loaded trip out of the back level switch. When this trip had passed him he attempted to follow it out and did not apparently notice the trip of the inside main hoist dropping into the back level switch, which struck him, dragging him a distance of about 30 feet, causing contusions of the right side of the chest and numerous other contusions and abrasions on the trunk of the body, and a general strain of the muscular system.

July 21st, 1896. An accident occurred at 1:10 p. m. on this date, at the Winter Quarters mine of the Pleas-

ant Valley Coal Company, by which E. Vigfuson, a yardman, had the second and third fingers of the left hand crushed. He was at the time coupling cars in the yard, when his hand was caught, causing the injury named.

October 19th, 1896. James Russell, mine foreman of Pleasant Valley mine, was pulling spikes from a piece of track in the above mine, when a piece of coal fell from the roof, and struck him, causing a fracture of the ninth, tenth and eleventh ribs, about two inches from the vertebral junction.

November 30th, 1896. At 11:30 o'clock a. m., Jasper Pascuzzi, a coke shoveller at the coke ovens of the Pleasant Valley Coal company at Castle Gate, suffered rupture of the bladder and a fracture of the pelvis, by being caught between a moving railroad car and the wall of one of the docks of the ovens. Pascuzzi, it seems, was at the time in the employ of a contractor who was loading coke into railroad cars. The contractor was letting down, by hand, a partially loaded car between the docks of the two parallel rows of ovens. The injured man and two others had been engaged cleaning the railroad track between the docks. As the car approached them, the contractor signalled them to get out of the way. Two of the men climbed upon the docks, which are about four feet above the level of the railroad tracks, but Pascuzzi merely stepped back close against the wall of the dock, apparently believing there was room enough between the dock and passing car. About half the length of the car had passed him without injury, when some projection on the car struck him, causing the injuries specified.

December 28th, 1896. At 2:30 o'clock p. m., Moia Giacomo, a miner in the Pleasant Valley Coal company's Castle Gate mine, was injured while working on No. 5 entry, off eighth rise, room No. 17 pillar. He and partner were engaged, robbing the pillar, and had drilled two holes along the roof. They had finished their undermining, with the exception of about two inches at the bottom, when the coal fell, striking Giacomo on the leg and foot, holding him fast until the coal was removed. The injury consisted of a disloca-

tion of the ankle and simple fracture of the Fibula and slight bruise on the outside of the knee and lower part of the thigh.

CASTLE GATE MINE.

This mine is the property of the Pleasant Valley Coal Company, a corporation, and is situated at Castle Gate station, 108 miles southeast from Salt Lake City, in the county of Carbon, and on the line of the Rio Grande Western railway. My first official visit of inspection to this mine was made on May 15th, 1896, and covered the time from that date to May 20th inclusive. The average number of men employed was 310 daily.

Artificial ventilation for this mine is provided by a Guibal Exhaust Fan, which at that time passed 48,020 cubic feet of air per minute through the mine. I found the mine admirably equipped with machinery, having a Thompson-Houston Electric haulage plant, four electric hoists and other modern appliances. Owing to the very inflammable nature of the dust of this mine, extra precautions have been taken to obviate the danger to the employes from this source.

Water is conveyed to every portion of the mine by means of a system of pipes laid throughout and by means of a hose and steam the working faces and all other portions are kept constantly sprayed by men employed for this purpose.

I found during this visit that there were occasionally small feeders of carburetted-hydrogen gas, and while there was some accumulations of small quantities of this gas over the old caves, the quantity was too small to be dangerous, and the company had very judiciously provided against danger from this source by the employment of four competent fire bosses whose duty it was to visit all portions of the mine twice a day, and to remove all accumulation of gases.

The management had also provided, as the law requires, a supply of suitable timber for props and caps,

which were kept convenient to the workings. I suggested at this time the widening of the main return airway which the company agreed to immediately do. The mine was provided with the number of tunnels and other outlets and three escapement ways separated the distance required by law, by means of which ingress and egress were available to the persons employed in the mine.

Since the disastrous explosion of 1890, by which three men lost their lives, a new system of firing has been adopted, and now instead of the shot-firers entering the mine with a hand dynamo, as was done previous to that date, all the shots are fired simultaneously by means of an electric current applied from the surface.

Wood pulp is used for tamping purposes, and the current is not applied to the shots until the ventilating air current and the coal dust has been thoroughly sprayed and all workmen for the day checked out of the mine, the shots being fired about 7:30 o'clock in the evening.

I also inspected the property on August 26th to September 1st, and again made a thorough inspection from December 2nd, to December 9th. It is by far the most extensively and systematically operated coal mine in the state, and the product greatly exceeds that of any other.

The management is to be commended for its progressive spirit and the many precautionary methods adopted for the safety and comfort of its employes. The mine has been heretofore operated on the single entry system, but as the workings are now reaching to great depths, it is my belief that the adoption of a double entry system will become necessary and I have so recommended to the management.

The outside improvements at the mine during 1896, consisted of an additional elevator and conveyor, large storage bins for slack for the coke ovens, and twenty new ovens, making a total of 104 ovens now in use.

Analysis of coal from Castle Gate mine:

Moisture.....	1.50
Volatile matter.....	44.62
Fixed Carbon.....	50.22
Ash	3.20
	99.54
Sulphur46

The output from the Castle Gate mine in 1895 was 205,580 and in 1896 185,319 tons. The decrease was due to the fact that in 1895, after the deplorable explosion at the Southern Pacific company's mine at Almy, Wyoming, the latter company drew largely upon the Pleasant Valley Coal company for its supply of coal, which was not the case in 1896.

WINTER QUARTERS No. 1 MINE.

This mine was first opened about the year 1878, and from that time until 1882 the product was shipped to Provo and intermediate points over the Utah & Pleasant Valley Railway, a narrow gauge line connecting these points. At the latter point connections were made with the then Utah Central Railway. In 1882 the mine and narrow gauge road were sold to the Denver & Rio Grande Western Railway company, and both were operated by that corporation until the year 1885 when the mine became the property of the Pleasant Valley Coal company and passed under the management of Mr. W. G. Sharp, the efficient superintendent of the last named company, and whose name is so closely connected with the coal developement of the state. Mr. Sharp had been up to that time the superintendent of the mines of the Union Pacific company and continued in that capacity for both companies for several years until the extensive interests of the P. V. Coal Co., demanded his undivided attention.

In 1886 the workings encountered a fault and the mine was closed until 1895 when it was reopened by driving 500 feet through rock to reach the large field of coal beyond the two faults which had been met with in Nos. 1 and 3 mines.

During the year 1896 rapid development was made in the new and extensive field of coal, which is of an excellent quality.

I made three visits of inspection to this mine during the year. It is equipped with modern electric hoists and appliances for rapid and economic production. Ventilation is provided by an exhaust fan placed at the mouth of the old No. 3 mine, the tunnel of which serves as a return airway for No. 1. The average quantity of air passing through the mine is 15,693 cubic feet per minute which is quite sufficient for the number of men employed, the average number being 84.

The current of air is somewhat impeded by the friction in the return airway, which is small, being for a considerable distance through rock, but the management is now driving to reach the surface at a point about 500 feet east from the mouth of No. 3.

Proper escapements are provided, and as there is no trouble from gas, the mine is comparatively safe. Suitable timbers and props are kept convenient to the working places, and in other respects the management has evinced a desire to comply with the law and to provide for the safety of the employes.

The amount of coal produced in 1896 has been estimated in connection with the output of No. 2 mine, both mines producing 122,478 tons. This is 24,007 less than the product of 1895, the decrease here being from the same cause as that at the Castle Gate mine, which was due to the fact that in 1895 the Southern Pacific Railway company drew more largely from the P. V. Coal Co. for its supply of coal than in 1896, the S. P. mines at Almy, Wyoming, having been idle for a considerable time during the former year on account of the memorable explosion.

The analysis of Winter Quarters coal is as follows:

Moisture.....	3.20
Volatile matter	45.67
Fixed carbon	47.22
Ash.....	3.35
	99.44
Sulphur.....	.56

WINTER QUARTERS NO. 2 MINE.

This mine is also the property of the Pleasant Valley Coal company, and was opened in 1882. It has been steadily operated since that time. I made three visits to this property during 1896 and found it in good condition.

The same attention to dust is not required here as in the Company's Castle Gate mine, as it is not so inflammable; and as the mine has a fire-clay floor it would be inclined to heave under excessive watering.

It is ventilated by an 18-foot Guibal fan, and the current amounts to 24,000 cubic feet of air per minute; as the average number of men employed is eighty-three, this amount of air is sufficient.

Until a few years ago it was the heaviest producer in Utah. It is provided with electrical hoists, and electric locomotives for hauling the coal. Escapement ways are provided as required by law, the main escapement reaching the surface about a quarter of a mile east of the mouth of the mine. The output has been computed for 1896 in connection with that of No. 1 mine, the two producing 122,478 tons in that year. This is less than the amount produced in the preceding year, the cause of the decrease being explained in my report of the No. 1 mine. An analysis of the coal may also be seen by reference to my report of No. 1 mine. The improvements during the last year consist of an elevator and conveyor, and large storage bins for slack and nut coal.

PLEASANT VALLEY MINE.

This mine is situated at Scofield, Carbon county, on the Rio Grande Western railway, 110 miles southeast from Salt Lake City. It is the property of the Union Pacific Coal Company, and is under the direct supervision of Mr. J. R. Sharp. The property was first opened and slightly developed some years ago by Phillip Pugsley and associates, and in 1882 was purchased by Mr. W. G. Sharp for the Utah Central Railway Company. Later the road and mine became the property of the Union Pacific Company, and has been steadily operated up to the present time. It is and has been one of the safest mines in Utah, having experienced but one fatal casualty since its opening. It is worked on the room and pillar system. The vein is from 28 feet to 32 feet in thickness. In driving in, the rooms are made 18 feet high, and the top coal is taken down when the room has been finished. Ventilation is provided by a furnace and at each of my three visits during 1896, I found a sufficient quantity of air for the men and animals. The average number of men employed during the year was 63, and the average number of mules used in the mine was 8. The amount of air was an average of 17,400 cubic feet per minute. The principal trouble experienced by the management is the frequency of gob-fires but these have in all cases been kept under control by walling up the section in which they occurred, thus preventing the access of fresh air. Hauling is done entirely by the use of mules and there are therefore no engines, hoists or machinery of any description used in extracting the coal. Even the sprinkling of the mine is accomplished by the use of a water car, and as there is no trouble from gas the product is obtained cheaply, safely and easily. The total output in 1895 was 46,745 tons and in 1896, 55,113 tons. The average number of days the mine was worked in 1896 was 107. An analysis of the coal is given below:

Moisture.....	4.36
Volatile matter.....	46.03
Fixed Carbon.....	45.10
Ash.....	4.51
	<hr/>
	100.00
Sulphur.....	.77

KIMBALL MINE.

The Kimball Mine, owned by O. G. Kimball of Scofield, is located about two miles from the Rio Grande Western depot at Scofield.

The first opening was made in 1885 and has produced a small quantity of excellent coal every year since that time. The output has been used locally and the property is only operated during the autumn months. The product during 1896 amounted to 471 tons of lump.

COAL FIELDS OF SUMMIT COUNTY, UTAH.

This district which is known as the Coalville Grass Creek district, and the product known in the market as Weber coal, comprises vast deposits of coal, the extent of which, while not yet accurately determined by complete geological surveys, shows in the outcrop for a distance of about ten miles.

Operations, more or less extensive, have been carried on here for the last three decades.

The general strike of the measures is northeast and southwest and dip to the northwest at angles varying from 20 degrees to 35 degrees. Apparently there is but one workable vein of practical value, which var-

ies from 7 to 14 feet in thickness, though there is yet another vein, known locally as the "four foot" vein, which does not seem to be at present valuable. The stratum has been dislocated by upheaval, large "faults" or "wants" separating the different properties owned and operated by the different companies. Smaller ruptures of the stratum, running in a direction almost parallel to the dip, have still further broken up the measures. As operations approach these minor ruptures, the coal becomes softer, until at the fault it is ground to dust and is no better than ordinary slack, but must be removed to the surface to prevent gob-fires and spontaneous combustion. To meet these difficulties, the most economic management is required in order that the product may cover expenses. Passing these ruptures, the coal increases in quality until another is approached, when the same conditions appear; the quality of merchantable coal being governed by the frequency of the minor faults.

The greater faults, or "wants," separating the different bodies of coal, have exposed the seam in the gulches, and generally the operators have taken advantage of this in developing the properties. The character of the coal varies considerably in different localities of the district. The formations surrounding the vein are a shale or slate floor and sand rock roof, the latter being about forty feet in thickness.

The principal mines of the district are the Wasatch Mine, operated by the Weber Coal company; the Cullen mine, the Williams mine and the Old Church mine, operated by the Grass Creek Coal company; the Hopkins mine, operated by the Hopkins Coal company, and the Wilson mine, operated by the Salt Lake Coal company. Besides these, there are the Old Allen mine, once operated by the Chalk Creek Coal company, but now practically worked out, and the Thomas mine, once operated by Gomer Thomas & Sons, but for several years practically idle. Several other openings have also been made at different points on the outcrop, but at present are unimportant as producers.

Of the properties above enumerated, those having rail connections are the Cullen, Wasatch and Hopkins.

WASATCH MINE.

My first official visit to this property was made on June 16, 1896. The mine is situated in the county of Summit, in the Coalville, Grass Creek district, on a spur of the Park City and Echo Branch of the Union Pacific railway extending three miles from Coalville. This property was formerly operated by the Home Coal company, later by the Weber Coal department of the Ontario Silver Mining company, and now owned and operated by the Weber Coal company. It is the largest producer and withal the most extensively operated mine of the district. It is equipped with engines, boilers, hoist, shaking and revolving screens, elevators for raising small coal to rescreening apparatus, bins, automatic tipples, chutes with automatic aprons, pumps of ample capacity for handling all the water developed, tanks for receiving water pumped from the mine whence it is utilized for boiler purposes, cars, cables, sheave-wheels, track, supplies and timbers, such as props, caps, etc.

The mine is operated on the room and pillar system. The coal is of a tender nature, cross-fractured and of little power of resistance, and therefore large pillars must be left between rooms to prevent squeeze and heaving of the soft bottom.

Prior to January 1st, 1893, the output was hoisted through a shaft about 200 feet from the present hoisting works, but since that time the coal has been hoisted through a slope driven in the rock at the surface at an angle of 36 degrees, a distance of 256 feet, where it strikes the coal seam at a point 200 feet below the level reached by the old hoisting shaft, the measurement being taken on the dip of the coal seam, which is 19 degrees from the horizontal. The slope has been continued on the pitch of the vein 300 feet below the level of the point where the seam was first tapped. Each side of the slope, levels 100 feet apart have been driven on the vein to the rise, on a slight grade, to facilitate hauling and drainage. All water developed drops to the sump below the lowest level, whence it is pumped to tanks at the surface. Artificial ventilation is now provided by means of a furnace and stack built

over the mouth of the return airway at the surface, assisted by the heat of the steam pipes and a steam jet in the shaft.

The intake, (9,000 cubic feet of air per minute), is through the slope, and the current is divided at the bottom by regulators and is carried along the lowest levels to the faces, thence up the last rise break-through to the next level above and through the break-throughs between the rooms, thence through rise airways to each succeeding level above, thence through the upcast airway and air shaft to the surface. From the level above the 300-foot level the coal is lowered down inclines, driven diagonally across the pitch, by means of wire ropes conducted over sheave-wheels at the top of the incline, the empty cars at the other end of the ropes being hauled up by force of the gravity of the descending loads. Working places in the rooms are made 15 feet wide. From the working faces to the top of the incline loaded and empty cars are hauled by means of horses and mules.

During the last three years the company has not operated the property above an average of three days a week on account of the somewhat limited market within its reach.

The production of the mine from 1881 to 1896 is given below:

Year.	Tons.
1881	22,870
1882	29,204
1883	35,967
1884	23,718
1885	21,858
1886	22,802
1887	27,710
1888	28,603
1889	34,701
1890	32,565
1891	37,252
1892	39,278
1893	37,212
1894	*41,856
1895	43,525
1896	54,424

*Estimated.

Analysis of coal from Weber Coal company's Wasatch mine:

Moisture.....	8.38	per cent.
Volatile Matter.....	46.89	“ “
Fixed Carbon.....	40.45	“ “
Ash.....	3.33	“ “
	<hr/>	
Total.....	99.05	“ “
Sulphur.....	.95	“ “

CULLEN MINE.

The Cullen mine was opened about nine years ago and a year later became the property of Matthew Cullen and Henry Spriggs. Three years ago these parties sold to the Grass Creek Coal company.

It is situated at the end of the Grass Creek Terminal Railway, near the head of Grass Creek. Railway connection was made in the fall of 1895.

I found here the often repeated mistake of attempting to secure a profitable output without attaining depth, and such improvements as have been made are not of a permanent character, while the limit to the capacity of the outside equipment would not exceed fifty tons a day.

Ventilation is supplied by natural agencies, and during my first two visits was not good; but at the time of my last visit was considerably improved. Natural ventilation is always uncertain and unreliable, owing to atmospheric conditions, the changes of the barometer and thermometer and the direction and force of the winds, particularly so in the shallow mines. The management has been disposed to do all in their power to insure safety and to comply with all the requirements of law, but much remains to be done to place the mine among the progressive producers.

There are two other openings, near the Cullen, belonging to the same company. These are known as

the "Lower Church Mine" and the "Old Church Mine." The latter has been worked in a desultory way for many years and has produced an excellent quality of coal. The output, amounting to about thirty tons a day, is hauled by wagons and loaded at the Cullen. The former is worked by contractors and produces about twenty tons a day.

HOPKINS MINE.

On June 15th, 1896, I made my first visit of inspection to this mine, situated about one mile from Coalville in a northerly direction, at which time only eight men were employed.

As far as operations have progressed, the mine has been worked in an intelligent and systematic manner. It is worked on the room and pillar system, the surface equipment consisting of a pair of 12x16 geared hoisting engines, two boilers of about 50 horse power each, screening and other apparatus in excellent condition and sufficient for capacity of 300 tons daily. The main opening is a slope driven on the dip of the vein, which is at an angle of 25 degrees. At a distance of 900 feet from the surface, the slope encountered a "want" or old river bed, where the coal pinched entirely. Such a phenomenon has never before been encountered in any of the other districts of this State, and has rarely occurred elsewhere in the whole history of coal mining.

Driving through this "want," the vein was again tapped on the same dip and now at a distance of about 1,100 feet the bottom of the slope is in coal. Considerable air is supplied by natural causes, through another opening, the quantity at the intake being 12,000 cubic feet per minute; but for sinking ahead of the air a No. 5 Baker blower is provided with a ten inch pipe laid in the slope. The quantity of water so far developed is little in excess of the amount necessary for feeding the boilers and is lifted from the sump into settling

tanks at the surface. Levels have been run on each side of the slope about 100 feet apart. The mine only produced coal for a few months during the year, on account of having encountered the "want," and for this reason only, the output has fallen below that of 1895.

WILSON BROTHERS' MINE.

This mine formerly operated by the Salt Lake Coal company, is situated at the head of Spring Hollow, about three and one-half miles from Coalville, in the county of Summit.

The surface equipment consists of a twenty-five horse power Cooper engine and steel hoisting rope. At the time of my first visit, August 23rd, 1896, it depended upon natural agencies for ventilation, but at my suggestion the air supply has been augmented by the use of a small furnace. The coal is hoisted through the slope. The vein is the same as in the Weber Coal company's Wasatch mine, and of the same thickness. The mine is in general good condition, escapement way and other means of safety being provided.

ALLEN HOLLOW MINE.

This mine is located about one and one-half miles from Coalville in a northerly direction. Coal was first struck in the property in November, 1892, and the product was of fine quality. It has not been operated during the past year, the workings having reached a "want" where the coal pinched. The vein, however, will doubtless be encountered again when this "want" is passed.

WILLIAMS' MINE.

This property is in the Coalville Grass Creek district. It was opened about 23 years ago, and has only been operated on a small scale at intervals since that time. The mine was not worked during 1896.

Besides these there are numerous other properties in the district from which considerable coal has been extracted in the past but they are at present idle.

SANPETE COUNTY DISTRICT.

The principal coal fields of this district are situated about five miles south of Manti, near the village of Sterling. The dip of the vein is at an angle of about — degrees at the surface, pitching to the south-east. The only openings are those of the Sterling Coal & Coke company and of the Edmunds mine, both on the same vein, and about one-fourth of a mile apart. The vein varies somewhat in thickness and quality, the average thickness ranging from three to six feet, carrying in places bands of slate and bony substances.

STERLING COAL AND COKE COMPANY'S MINE.

The development of this mine consists of an incline driven diagonally across the true dip of the measures, a distance of about 700 feet, but the operators were driven from this incline by water and no coal has been extracted from this point for nearly a year.

The surface equipments are a hoisting plant, rated at fifty horse power, with tipple structure, screens, loading tracks and apparently all that is necessary for an ordinary coal mine.

The drowning out of the incline caused the management to begin the driving of a drain tunnel across the measures from a point considerably below the level of the mouth of the incline, by which it is intended to drain the drowned-out workings, besides several hundred feet more of undeveloped ground. This tunnel has been driven a distance of 500 feet, and it is the expectation of the management to push it to a depth of 2,200 feet to accomplish the purpose intended; but the work is at present suspended and nothing has been done in this direction within the past four or five months.

The following is an analysis of the coal from this mine:

Moisture	3.78	per cent
Volatile matter	50.11	“ “
Fixed carbon	44.65	“ “
Ash	1.46	“ “

EDMUNDS MINE.

Operations on this property consist of two inclines driven diagonally across the true dip of the measures, somewhat crudely, developing less than 200 feet of the vein on the dip. Like many other properties, this one seems to have been operated more with a view to immediate output than to future production, the plan being to rob the surface deposits rather than develop the deeper ones. The number of men employed at the time of my first visit was nine, and there was sufficient air passing in at the intake for this number; but if the number should be increased, other means of ventilation must be employed, though some simple and inexpensive changes suggested to the management will increase the quantity of air very materially.

There is a want of a proper equipment or definite plan of development. Hoisting power is provided by the use of one of those much-maligned, though meek

and patient little animals on which our Savior rode into Jerusalem, assisted by that supposed nobler quadruped, a horse; yet with this primitive power, be it said to the credit of these faithful animals and the industry of the operators quite a quantity of coal is produced, the average output being between 20 and 30 tons of lump daily when operating.

Analysis of coal from Edmunds mine:

	Top Coal.	Middle Coal.	Bottom Coal.
Moisture	7.07	7.15	6.38
Volatile matter. . .	43.18	42.74	42.60
Fixed carbon	44.07	45.80	45.46
Ash	5.68	3.95	5.56

FAIRVIEW MINE.

This mine, commonly called the Huntington mine, is situated on Huntington creek in the extreme western border of Emery county, about 12 miles from Scofield, 15 miles from Fairview and 20 miles from Mt. Pleasant.

At the time of my first visit, which was on the 28th of September, 1896, there were but two men employed. The mine is only worked a few months in the fall of the year to supply the local trade of Mt. Pleasant and Fairview, Mr. Ezra D. Jones being the lessee of the property. The coal is of good quality and the vein has an average thickness of about ten feet. The mine produced about 900 tons in 1895 and about the same amount in 1896. It was first opened in 1875 and in the following year eleven bee-hive coke ovens were erected, and during the two years following about 1,000 tons of coke were produced and hauled by wagon to the Salt Lake Valley smelters; but no coke has been produced since 1878.

The property is owned by the Fairview Coal & Coke company, Mr. Sumner J. Harkness being their manager.

Analysis of Fairview mine's coal:

Moisture.....	3.7	per cent.
Volatile matter.....	43.3	“ “
Fixed carbon	48.9	“ “
Ash	4.1	“ “
	<hr/>	
Total	100.0	“ “

 WALES MINE.

This mine, the property of the Sanpete Valley Railway company was not operated during the year 1896. It is the oldest coal mine in the State, having been opened in 1855 when the output was consumed by the surrounding settlements. Two years later eighteen ovens were built for making coke, but the experiment was not a success.

The development of the property has been upon the most primitive methods, which will necessitate much extra labor when operations shall be resumed.

There is a small opening on the same vein a short distance north of the Wales mine. This is owned by T. J. Reese and W. F. James, and produced about 200 tons during the past year. These properties are situated near Wales, in Sanpete county, in what are known as the West mountains.

 BEAR CANYON MINE.

This mine is situated in Bear canyon, a branch of Huntington canyon, and about fourteen miles from the town of Huntington. It is little more than a prospect. The face of the main drift is scarcely 100 feet from the crop line. There are usually about two men employed

for two or three months in each year to supply the settlements of Castle Valley. The vein is about eleven feet thick and occurs in the Laramie division of the Cretaceous. The analysis being as follows:

Moisture	3.7	per cent
Volatile matter	43.3	“ “
Fixed carbon	48.9	“ “
Ash	4.1	“ “

OTHER DISTRICTS AND PROPERTIES.

Outside of the mines specially mentioned, there are a large number of smaller properties operated on a small scale by individuals for home consumption or for a strictly local trade; and while most of these may not, strictly speaking, be called mines, some of them are prospects of great promise, and only await transportation facilities to become large and profitable producers.

I visited many of these during the year, not because absolutely required by law to do so, but more for the purpose of obtaining a fuller knowledge of the extent and quality of the various coal deposits of the State.

During the month of August I visited the coal fields in the vicinity of Vernal in Uintah county. From numerous small openings all the coal consumed by the surrounding settlements is extracted, and a considerable portion of the product has been freighted to the military post at Fort DuChesne, a distance of twenty-four miles.

The openings in this vicinity include two made on Brush Creek, east of Vernal, by Wilson Bowen, Peter Jensen and A. D. Hullinger; seven north of Vernal by Pardon Dodds, William Gibson, John Shell, Riley Green, Thomas Edwards and A. Taylor; eight northwest of Vernal by the Vernal Milling and Live Stock company, Lorenzo and A. T. Hatch, J. M. Jones, Charles Glines, William Bradshaw, Richard Blakey, H.

and B. Timothy, Thomas Edwards and Curt Hadlock; one south of Vernal by Arthur Gardner; one on Deep Creek, west of Vernal, by Thomas Labrum; one southwest of Vernal by R. Gill and A. Johnson, making a total of twenty-two openings, though none extensively operated for want of a market for the product.

The oldest of these is that made by R. Gill. Of those mentioned above, Pardon Dodds, William Gibson and R. Gill have secured patents.

Besides these, there are in the counties of Emery, Piute, Grand, Garfield, Iron, Washington, Sevier and Millard, and in fact in nearly every county in the State, extensive deposits, which but await an outlet or the establishment of local factories to pour their wealth into the commerce of the State.

But of the undeveloped coal fields in the counties above mentioned, those of the county of Emery seem to be the most extensive and most promising. Skirting the foothills from the vicinity of Castle Gate, and reaching southward along the western border of Castle Valley, to the mouth of Salina canyon, a distance of more than 70 miles, is what is locally known as the "White Ledge Vein," though in reality but a continuation of the Castle Gate vein. The quality of the coal continues the same, increasing in thickness to the south until Quitchenpah is reached, where a break in the formation occurs.

The local supply is obtained from numerous small openings along this great vein, but with proper transportation the output will reach vast proportions.

There is also another vein in this county in the vicinity of Blake, upon which a small beginning has recently been made by Thomas Farrer, of Green River station.

In the county of Carbon, about ten miles north of Price, two openings have been made on a vein, one by the Price Trading company, a corporation, and the other by John B. Millburn, of Price, both of which give promise of becoming profitable producers.

In the Henry mountains, along the southern end of the range, in the county of Garfield, are extensive deposits of coal of an excellent quality, and while the probability of an outlet in the near future for this re-

gion is by no means encouraging, the hope remains that the coal may soon become very useful in developing the metaliferous veins of these mountains and in working the extensive placer bars along the Colorado river.

Again we find, in the county of Iron, large and valuable veins of excellent bituminous coal, but like many other localities, railway connections are wanting to render useful the vast riches which nature has bestowed.

Particularly are the coals of this region regarded as of great future value and importance on account of their proximity to the great iron deposits of this county.

But there is scarcely a locality within the State that cannot uncover a neighboring vein and supply all reasonable demands that may be made upon it.

COKE.

While the coke industry in Utah is not very extensive the production is steadily increasing and promises in the near future to assume still greater proportions. When transportation facilities shall have justified and when the determination to utilize the wonderful iron deposits of our State shall have taken definite shape we may expect the production of coke to become one of the leading industries, and even before that auspicious day improved methods of coke production may be inaugurated whereby we may lessen the competition with the Eastern article by the production of a cheaper yet superior grade. The first attempt to make coke in Utah was near the town of Wales, in Sanpete County, in the year 1857, and the experiment was continued at intervals from that time up to 1879. From 1876 to 1878 the Fairview Coal and Coke company produced some coke which was hauled by wagon to Springville.

The next series of experiments to produce marketable coke from Utah coals were made by the Pleas-

ant Valley Coal company, the result being the creation in the year 1889 of eighty bee hive ovens at Castle Gate. Within the past eighteen months twenty-four additional ovens have been created, making a total of 104 now in constant use, and notwithstanding the competition of the Eastern product the company is finding a fair market for all it can produce. The product of the Castle Gate ovens amounted in 1896 to 20,448 tons.

HYDRO-CARBON MINES.

Embraced within the classes of mines which Chapter CXIII of the Laws of Utah, 1896, require me to inspect, are the hydro-carbon mines, and the producers of this class are, strictly speaking, peculiar to my jurisdiction, there being no others known within the United States, and few in the world, whose output resembles that taken from the hydro-carbon deposits of Utah. This class embraces the producers of gilsonite or pure asphaltum, extensive deposits of which have been discovered in the eastern portion of the State, principally in the counties of Uintah, Wasatch and Carbon.

So far as is known, no such deposits, approaching these either in extent or quality, have been discovered elsewhere in the world. Aside from gilsonite, fissures of elaterite, ozokerite, wurtzillite and other hydro-carbons exist within these same localities, and though not yet developed as to extent and adaptability to commercial uses nor quoted at a fixed market value, are still of such known extent and use as to place their value beyond mere speculation. Indeed there is scarce a limit to the uses which these substances may be applied, nor does a doubt obtain as to their future value, while the possibilities are regarded as beyond computation. The larger deposits, however, of the last named mineral, lie within the boundary lines of the Uintah reservation, and therefore cannot be utilized.

But with reference to gilsonite, the value and extent of the deposits have passed beyond the interroga-

tive, for the operations upon these minerals, though yet what might be termed merely a beginning, have demonstrated beyond question the permanency and quality of the material, and the output is met with an ever-increasing demand; and while want of transportation facilities has been the greatest obstacle, the demand for the substance has overcome even this great difficulty.

Up to the present time, operations upon gilsonite have been confined to two veins: one located in the vicinity of the United States military post at Fort Duchesne, and the other in the eastern portion of Wasatch county, near the south boundary line of the Uintah reservation. The former is owned and operated by the Gilsonite Asphaltum company, a corporation organized under the laws of the State of Missouri, and the latter by the Culmer Brothers of Salt Lake City.

GILSONITE ASHPHALTUM COMPANY'S MINE.

This property consists of a vertical fissure cutting the formation from southeast to northwest, of an average width of two and one-half feet between walls of oily sandstone.

At the beginning extraction was by means of trenching, but lately a series of vertical shafts have been sunk about 150 feet apart and levels run in each direction at intervals of 50 feet and the mineral stoped to within about 15 feet of the surface. The lowest level yet reached is about 100 feet and the lateral extent of the different underground workings consume a distance of about 1,000 feet. The annual and total output is given elsewhere. The average number of men daily employed in the mine is three, and while this was within the number in which the statute makes my visits of inspection discretionary rather than imperative, I deemed an inspection necessary on account of the known inflammable and explosive nature of the dust produced by the breaking down of the gilsonite.

My first visit was on August 17th, 1896. There were then employed two miners, one foreman and one

teamster for hauling water. The general condition of the mine was good and the ventilation fair, though capable of cheap and easy improvement. I made verbal suggestions relative to these improvements, which I found afterwards had been readily complied with. I also suggested by letter other improvements in the way of additional timbers and found at my subsequent visit that this suggestion had also been adopted.

My next visit was on November 27th. I hastened there at this time on account of the occurrence of the fatal explosion in this mine on November 24th, 1896, a detailed account of which appears in this report, under the head of "Fatal Accidents."

The first development of the mine was begun in the summer of 1888, and as this may be said to have been the initial step in the production of hydro-carbon minerals in Utah, a short history of the discovery and subsequent operations of the property may not be out of place here.

In the year 1862, in pursuance to an Act of Congress, President Lincoln issued an executive order creating the Uintah Indian reservation. Several years later, after the Agency had been removed from the upper DuChesne to the present location on White Rocks and Uintah, the Indians discovered what they supposed to be a vein of coal. Samples of this vein were taken to the then agent, Pardon Dodd, who discovered it was not coal, and knowing of no use for the strange material, paid no further attention to it.

In 1885 some of this material or "wax" was found at the home of the ex-agent at Ashley, and was brought to Salt Lake City, where numerous analysis were attempted. Enough was learned that it was determined to prospect and locate the vein and afterward make further determination of the physical constitution and commercial value of the substance. Accordingly, early in January, 1896, locations were made, after which experiments were continued at Salt Lake City, but with indifferent success. Undiscouraged, however, Samuel H. Gilson was dispatched with some of the material to Washington, D. C., where at the Smithsonian Institute a scientific analysis was obtained,

and the name "Gilsonite" applied as a technical distinction.

Afterward, during the same year, it was discovered that the locations were just within the eastern boundary of the Uintah reservation. But still not discouraged by this discovery, the company, comprising as principals R. McIntosh, R. C. Chambers and George Goss, set about to secure the restoration of the small portion of the reservation bearing the material, to the public domain.

Success in this crowned their efforts, and on May 8th, 1888, a bill was signed to that effect. Development was soon afterward begun on a moderate scale and some of the then limited product freighted to Price on the R. G. W. railway and thence shipped to eastern points where experiments were prosecuted on a more extensive scale. A company had been organized at St. Louis for handling the product, and becoming convinced of the value and ultimate demand, opened negotiations with the owners and in the closing months of 1889 acquired possession of the property. During the year a considerable demand for the output had been created and in the same year the efforts of the ever faithful, persistent and ubiquitous prospector resulted in the discovery of several similar but larger veins of gilsonite, then supposed by some to be within the State of Colorado, though actually within Utah, and within the lines of what is commonly called the "Uncompahgre Reservation."

Since the restoration in 1888 of the "strip" containing the first discovered vein, mining has been continued, and though the output must meet the expense of a wagon haul of more than ninety miles to Price, the product has steadily increased, and is now being shipped to all parts of the world.

The general office of the company is at St. Louis, Mo., with general European agent at Hamburg, Germany, and eastern sales agent at New York.

The substance is used for insulation, varnishes, laquers, Japans, paints, roofing, paving, and for various other purposes.

Since January 1st, 1890, the product shipped from Price has amounted in round numbers to 16,000,000 pounds or 8,000 tons.

LAWS OF UTAH.

CHAPTER CXIII.

COAL MINE INSPECTOR.

An Act for the Protection of the Lives of Coal Miners, the Appointment of a Coal Mine Inspector for the State, Defining the Duties of said Inspector, Mine Owners, Lessees and Operators, and Prescribing Penalties for a Violation of the Provisions of this act, and Repealing all Inconsistent acts.

Be it Enacted by the Legislature of the State of Utah:

Section 1. That there shall be appointed a Coal Mine Inspector for the State. Such inspector shall, before entering upon the discharge of his duties, give bond to the State in the sum of \$5,000.00, conditioned for the faithful discharge of his duties, to be approved by the Secretary of State, said inspector shall be appointed by the Governor, by and with the consent of the Senate, and shall hold his office until his successor is appointed and qualified. The term of office of the inspector shall be four years from the date of his appointment; *provided*, That he may be removed by the Governor.

Sec. 2. That no person shall be eligible for appointment as Coal Mine Inspector under section 1 of this act, who is not a coal miner of at least five year's practical experience and who has not been a coal miner in this State, for at least two years prior to his appointment, and no person who shall act as land agent, manager, agent or mining engineer, for, or who is interested in any way in operating any coal mine in the State shall, during such employment, be eligible to the office of Coal Mine Inspector.

Sec. 3. It shall be the duty of the Coal Mine Inspector, provided for in this act, to make careful and thorough inspection of each coal mine operated in the State, at least quarterly, and report to the Governor at least once a year upon the condition of each coal mine in the State, with reference to the appliances for the safety of the miners, the number of air and ventilating shafts, slopes or tunnels, the number of shafts, slopes or tunnels for ingress or egress, the character and condition of the machinery for operating, ventilating and draining of such mines, and the quantity of the air supplied to the same.

Sec. 4. The owner, operator, or superintendent of every coal mine, shall make or cause to be made an accurate map or plan of such mine, on a scale of 100 feet to the inch, which map or plan shall exhibit all the openings or excavations, the shafts, tunnels, slopes, planes, gangways, entries, cross-headings, rooms, etc., of such mine; and shall show the direction of the air currents therein, and shall accurately delineate the boundary line between said mine and adjoining mines, and show its relations and proximity thereto. The said map or plan or a true copy thereof, shall be furnished to the inspector within ninety days after the passage of this act, and another copy shall be kept at such mine for the inspection of any employe therein. The said owner, operator or superintendent shall, as often as once in every six months thereafter, accurately place or cause to be placed on the map or plan and on said copies thereof, all the additional excavations which have been made during said six months in their mine. The several maps or plans of mine in the State which are furnished to the State inspector, shall be the property of the State, and shall remain in the care of the said inspector, be transferred by him to his successor in office, and in no case shall any copy of the same be made without the consent of the owner, operator or agent. If the said State Inspector of Coal Mines shall find or have good reasons to believe that any map or plan of any coal mine made or furnished in pursuance of the provisions of this act, is materially inaccurate or imperfect, he is hereby authorized to cause a correct plan or map of said coal mine to be made at

the expense of the owner or operator thereof, the cost of which will be recoverable by law: *provided, however*, that if the map or plan which is claimed to be inaccurate shall prove to have been practically correct, then the State shall be held liable for the expense incurred in making such test survey.

Sec. 5. That in case the said inspector shall report that any coal mine is not properly constructed or not furnished with proper machinery and appliances for the safety of the miners and all other employes, it shall be the duty of the Governor to give notice to the owner or manager of said coal mine that the mine is unsafe and notify them in what particular the mine is unsafe, and require them to furnish or provide such additional machinery, shafts, slopes, tunnels, entries, means of escape, ventilation or appliances necessary to the safety of the mines and the employes within a period to be in said notice named, and if the necessary changes be not made as in said notice required, it shall be unlawful after the time fixed in said notice for the said owner or manager to operate said mine.

Sec. 6. That in all coal mines within the State, the owner or manager thereof shall provide at least two shafts, slopes, tunnels or other outlets separated by natural strata or formation of not less than one hundred and fifty feet in breadth, by which shafts, slopes, tunnels or outlets, distinct means of ingress or egress shall always be available to the persons employed in said mine, and in case any coal mine is not so provided, it shall be the duty of the inspector to make report of such fact and thereupon notice shall issue as provided in Section 5 of this act.

Sec. 7. That the owner or manager of every coal mine at a depth of one hundred feet or more, whether the mine shall be operated by shaft, slope, tunnel or other outlet, shall provide an adequate amount of ventilation of not less than one hundred cubic feet of pure air per minute for each person at work in said mine, and three cubic feet of pure air per minute for each animal used therein, and in like proportion for a greater or lesser number, which air shall by proper appliances or machinery be forced through such mine to the face of each and every working place, so as to

dilute and render harmless and expel therefrom the noxious or poisonous gases; and all workings shall be kept clear of standing gas. *Provided further*, That in all mines wherein fire damp or other explosive gases are known to exist, double the quantity of pure air as hereinbefore mentioned in this section shall be required.

Sec. 8. That any mine owner or manager who shall continue to operate a mine, in violation of any of the provisions of this act, after the expiration of the period of the notice provided for in Section 5 of this act, shall upon conviction be fined not less than five hundred dollars nor more than five thousand dollars.

Sec. 9. That in no case shall a furnace shaft be deemed an escape shaft.

Sec. 10. That escape shafts shall be constructed in compliance with the requirements of this act within six months from the time this act goes into effect, unless the time shall be extended by the inspector, and in no case shall such time be extended to exceed one year.

Sec. 11. That in shaft or slope mines, where persons are lowered or hoisted by machinery, a metal speaking tube or other suitable appliance from the top to the bottom of the shaft or slope shall be provided in all cases so that conversation may be carried on through the same.

Sec. 12. That in shaft mines an improved safety catch shall be provided and sufficient cover over head on every cage used in lowering or hoisting persons, that there shall be provided at the bottom of every hoisting shaft at every coal mine worked by shaft in the State at the sides thereof, a traveling way, which shall be sufficiently high and wide so as to enable persons to pass the shaft without having to go over or under the cage or hoisting apparatus; and the inspector shall examine and pass upon the adequacy and safety of all hoisting apparatus.

Sec. 13. That only experienced, competent and sober men shall be placed in charge of hoisting apparatus or engines, and the maximum number of persons who may ascend or descend upon any cage or hoisting apparatus at one time shall be determined by the inspector.

Sec. 14. That it shall be lawful for the inspector to enter and inspect any coal mine in the State and the work and machinery belonging thereto at all times (but not so as to impede or obstruct the workings of the mine) and to make inquiry as to the condition of the mine, works, machinery, the ventilation and mode of lighting, and into all matters or things, connected with or relating to the safety of the persons employed in or about said mines. The owner or manager is hereby required to furnish means necessary for such entry, inspection, examination and inquiry. The said inspector shall make an entry in the records in his office, noting the time and material circumstances of such inspection.

Sec. 15. That in all cases of fatal accident, a full report thereof shall be made by the mine owner or manager to the mine inspector, said report to be in writing and made within ten days after such accident shall have occurred. All cases of non-fatal accidents which have been sufficiently serious as to prevent the injured person from continuing his regular employment for a period of one week from the time of the accident shall be reported to said inspector.

Sec. 16. That the owner, agent, or operator of any coal mine operated within the State, shall keep a sufficient supply of timber on hand to be used as props and cap pieces so that the workmen employed therein may at all times be able to properly secure said workings from caving in, and it shall be the duty of said owner, agent, or operator, to send down in the mine all such props or cap pieces, and place them not more than three hundred feet from the face of such workings.

Sec. 17. That as a cumulative remedy in case of the failure of any owner or manager of any mine to comply with the requirements contained in the notice of the Governor, given in pursuance of this act, any court of competent jurisdiction, or judge of said court in vacation, may on the application of the inspector, in the name of the State, and supported by the recommendation of the Governor, issue an injunction restraining the operation of such mine until such requirements are complied with, and, in order to obtain such injunction, no bond shall be required.

Sec. 18. That whenever the term "owner or manager" is used in this act, the same shall include lessees or other persons controlling the operation of any mine; and in case of any violation of the provisions of this act by any corporation, the managing officer and superintendent or other managing agents of such corporation shall be personally liable to punishment as provided in this act for owners or managers.

Sec. 19. The provisions of this act shall not apply to or affect any coal mine in which not more than six men are employed in twenty-four hours; *provided*, that when considered necessary by the inspector, he shall make or cause to be made an inspection of such mine and direct and enforce any regulations in accordance with the provisions of this act, that he may deem necessary for the safety, health, and lives of the miners.

Sec. 20. That for the purpose of this act, all hydro-carbon mines shall be deemed to be coal mines.

Sec. 21. The inspector shall devote the whole of his time to the duties of his office, and shall receive for his services an annual salary as provided by law, actual traveling expenses, not exceeding ten cents per mile mileage for all distances necessarily traveled in the discharge of his official duties, to be paid quarterly by the State Treasurer; and said inspector shall reside in the State. He shall collect from the owner or owners of each mine inspected a fee of ten dollars for each inspection made. Said fees shall be paid into the State treasury quarterly. All necessary apparatus that may be required by the said inspector to enable him to properly discharge his official duties, shall be paid for by the State, and the said inspector is hereby authorized to procure the same; all accounts for said apparatus shall be certified by the said inspector, audited by the proper department of the State and paid by the State Treasurer. All instruments, plans, books, memoranda, notes, etc., pertaining to said office of inspector of coal mines, shall be the property of the State, and the said inspector shall deliver the same to his successor in office.

Sec. 22. That all acts and parts of acts in conflict herewith are hereby repealed.

Approved April 5th, 1896.

CHAPTER XXVIII.

TO PREVENT THE EMPLOYMENT OF CHILDREN AND
FEMALES IN MINES.

An Act to Prevent the Employment of Children under the age of fourteen years, and Females, in Mines and Smelters.

Be it Enacted by the Legislature of the State of Utah:

Section 1. That it shall be unlawful for any person, firm or corporation to employ any child under fourteen years of age, or any female, to work in any mine or smelter in the State of Utah.

Sec. 2. Any person, firm or corporation who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor.

Approved March 2nd, 1896.

CHAPTER LXXII.

HOURS OF EMPLOYMENT IN MINES AND SMELTERS.

An Act Regulating the Hours of Employment in Underground Mines and in Smelting and Ore Reduction Works.

Be it Enacted by the Legislature of the State of Utah:

Section 1. The period of employment of working men in all underground mines or workings, shall be eight (8) hours per day, except in cases of emergency where life or property is in imminent danger.

Sec. 2. The period of employment of working men in smelters and all other institutions for the reduction or refining of ores or metals shall be eight hours per day, except in cases of emergency, where life or property is in imminent danger.

Sec. 3. Any person, body corporate, agent, manager or employer, who shall violate any of the provisions of Sections 1 and 2 of this act shall be deemed guilty of a misdemeanor.

Approved March 30th, 1896.