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Idaho Geological Survey's annual reports from the Idaho State Mine Inspector to the governor for years 1909-1913, originally in a single bound volume, are divided by year. A digital facsimile of the volume may be re-created by removing this page and combining PDF files for years 1909-1913.

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of

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TWELFTH ANNUAL REPORT

OF THE

MINING INDUSTRY
OF IDAHO

For the Year 1910.



F. CUSHING MOORE
State Inspector of Mines

1911
The Signal Company
Weiser, Idaho

Boise, Idaho, January 1, 1911.

To His Excellency, James H. Brady, Governor of Idaho:

Dear Sir:—I have the honor to submit herewith my report as State Inspector of Mines for the year ending December 31, 1910.

Very respectfully,

F. CUSHING MOORE,

State Inspector of Mines.

INTRODUCTION

Very little progress has been made in the mining development of the State during the past year, but the producing mines have maintained their output with a very few exceptions and a few properties have been added to the producing list, by having transportation facilities brought within commercial limits.

This lack of progress in development has been caused by the apathy displayed by the investing public, due primarily to the depressed condition of the money market and the reflex action of former flotations and development, which have proven failures.

This is an unhealthy condition of the mining industry, and in time will be overcome, at which time, it will be possible to continue an aggressive campaign of development, which is absolutely necessary in order to display the mineral wealth of a State, but to prevent a re-occurrence of depressed conditions, such as prevail, at this time, it is imperative that mining, and other promotions, are conducted along sane, legitimate lines and that only properties which have merit are developed to any great extent, and that all funds be expended in an intelligent manner.

Mining is very different from any other business, and only men who have had practical mining experience should be in charge of mining properties, for a man's intent may be good but he cannot but mis-manage and misrepresent conditions when he attempts to handle mining property, if he lacks the proper education and experience in mining matters.

In real estate and many other lines of business, if a piece of property is worth a certain sum of money, another similar piece of property located in close proximity should be worth some where near as much, and it is not very difficult to determine their relative value, but in mining it is very different for a mining claim may be worth \$1,000,000 and a claim immediately adjoining might be worth less than nothing. The only sane way to attempt to determine the value of a mining property, is by intelligent examination and intelligent development. If the examination is satisfactory, development work should be started, and if the development exposes conditions which are not satisfactory, it is necessary to use intelligence to determine when to cease operations as under other conditions, and not go blundering along indefinitely, spending money, just because there has been considerable money already spent on the property, and the promoter thought, in the

first place, that this prospect would be a mine in time, and that he would become immensely rich therefrom, and for this reason must not drop it, as there are many promising prospects in the State awaiting the assistance of capital to become productive, that a poor showing should be dropped and a good one taken up if the development justifies it.

So little development has been accomplished over the state during the past year, that if such an elaborate report as was issued last year were published at this time, there would be much needless repetition, therefore I have refrained from going into details on many properties which were pretty well covered last year, and copies of the 1909 report can be had for the asking.

FATAL ACCIDENTS

The mining industry in the State for the past year, has been very fortunate, in that very few fatal accidents have occurred. The most prevalent cause of accident was that of falling rock in the working faces of which there were seven fatal accidents, or about one for one thousand miners employed. Explosions of blasting compounds was responsible for two deaths and two men were killed by falling down chutes or raises, another death was caused by contact with a high tension electric wire used in transmitting power to the underground workings. This, however, is a very creditable showing and is due to the persistent efforts on the part of the mine operator to caution the underground worker to protect himself, as the vast majority of accidents are due to the carelessness of the injured.

The accompanying table shows the number of fatal accidents with the causes for the same, since the first of the year of 1903; prior to that time no record of fatal accidents was kept in this office.

Cause.	1903	1904	1905	1906	1907	1908	1909	1910
Fall of rock from work-faces	4	3	5	4	5	4	10	7
Explosion of blasting compounds	7	5	5	6	2	1	2	2
Falling down chutes raises and other openings	3	1	3	4	7	1	4	2
Hoisting accidents—bucket cage, or skip	3	0	2	0	0	1	1	0
Electrocution by contact with live wire	0	0	2	0	1	1	1	1
Car accidents	0	0	1	1	1	2	1	0
Tapping old workings	1	1	0	0	2	0	0	0
Caving bank in placer mine..	1	0	1	0	0	0	0	0
Suffocation from gas or smoke	1	0	0	0	0	0	0	0
Accidents in handling timber	0	0	1	0	0	0	0	0
Falling staging while drilling	0	0	0	1	0	0	0	0
Gasoline tank explosion	0	0	1	0	0	0	0	0
Total	20	10	20	17	18	10	19	12
Aver. No. men employed...	7000	6000	6000	7000	7000	5500	6000	6 00
Per cent of fatal accidents...	.285	.166	.333	.242	.255	.175	.333	.200

The above table emphasizes the fact that accidents are very largely unavoidable at times, for during the year 1908 only ten accidents occurred, while there were nineteen during 1909, and again during 1910 only eleven, but as ten of the nineteen accidents in 1909 were due to falling ground, it appears that it is negligence on the part of the miners themselves, rather than upon the mining operators, as the same precautions were taken each year. This point cannot be too strongly emphasized, for no matter how careful a company may insist upon the back being examined, prior to the time the shift goes on, by the time that several holes have been drilled by a machine, other rocks have been shaken loose and only constant watching by the men at the breast can prevent fatal accidents.

ADA COUNTY

Homestake Mine—Practically no mining of any importance has been carried on in Ada County during the past year, with the exception of the Homestake property, owned by the George F. Roth Mining Company, which has been operating its ten-stamp mill and cyanide plant at a profit, during the latter months of the year, but prior to this material alterations in the plant was necessary so that the total production of the year was quite limited, but I am informed that the property looks very promising.

Ironsides Mine—The Ironsides Mine was operating under a lease for a short time, but failed to make a profit and closed down. Further than this, no other properties in the county have more than represented their claims and done a very small amount of development work.

BANNOCK COUNTY

Practically no work was carried on at Fort Hall Mine during the past year, but about 250 feet in development was accomplished at the Papoose Mining Company, east of the Fort Hall Mining Company's property. This represents about all of the mining work of the county.

BEAR LAKE COUNTY

Bear Lake County contains a number of small properties carrying a variety of minerals, but the most important showing is found in the property of the San Francisco Chemical Company. This deposit occurs in a flat dipping sedimentary formation and contains phosphate rock, varying from a few inches to ten feet in thickness, carrying an average value of 60 to 70 per cent calcium phosphate. This property has been inactive for a number of years, but during the latter part of 1909 produced 735 tons of rock, which was shipped to San Francisco, but during 1910 6800 tons have been taken out and shipped.

BLAINE COUNTY

Blaine County, which at one time held a very enviable position in the production of lead and silver of the United States, has had an extremely dull season.

Idaho Con. Mines Co.—The Idaho Consolidated Mines Company of Bellevue, has been developing through the old shaft working of the Minnie Moore Mine, having accomplished about 2000 feet of work during the year, most of which was on ore bodies in the foot-wall of the Minnie Moore vein, however, work was suspended October 1st, and the property went into the hands of a receiver. I am informed by the manager that the leasers, who are now operating the property have recently developed considerable ore of commercial grade, in the same section last worked by the company.

Boston-Idaho Co.—The Boston-Idaho Company on Warm Springs Creek, near Ketchum, have been equipping a concentrating mill and magnetic separating plant, but very little work has been carried on in the mine.

Muldoon Mine—Considerable work has been carried on at the Muldoon Mine, and it is reported that considerable milling ore of a good grade has been developed during the latter part of the year.

Wilbert Mining Co., The Wilbert Mining Company located on Little Lost River, has operated with a small force of men during the greater part of the year, shipping two carloads of lead-silver ore.

BOISE COUNTY

More mining enthusiasm has been displayed in Boise County during the year than in any other south central county, for the reason that the Boston-Idaho Gold Dredging Company, Ltd., have recently installed one of the largest gold dredges in the country. This dredge was built by the Yuba Construction Company of Marysville, California, and is of the close-connected bucket type, each bucket carrying 13 cubic feet, the dredge having a total capacity of 8,000 cubic yards per day. This dredge has been installed on the company's property above Idaho City, and with the old dredge gives the company a daily capacity of 10,000 cubic yards.

The company has available for washing about 25,000,000 cubic yards of pay gravel, which averages about 25 feet deep, and includes an overburden of from 6 to 12 feet of tailings, which have been carried down from old placer operations. 40,000 cubic yards have been washed during the 1910 season.

Woodburn Placers—The Woodburn Placers were transferred during the year to eastern parties, who have operated the plant at a handsome profit.

Moline Mining Co.—The Moline Mining Company has operated its dredge of 2000 cubic yards capacity, on the property of the company, located near Placerville, during the entire season at a very good profit, so I am informed. The company's holdings are so extensive that the present dredge will be entirely worn out before the gravel available is exhausted.

Gold Hill & Iowa—The Gold Hill and Iowa Mining Company sank their vertical shaft to the 500 foot level and crosscut the vein. They have also operated their 20-stamp mill and cyanide plant for the greater part of the season, but owing to financial difficulties the mill has been closed down for some time.

The Golden Age Mng. Co.—The Golden Age Mining Company operating a property at Grimes Pass, near Pioneer-ville, has been mining a large mineralized area carrying iron pyrites disseminated through an altered granite, and is reported to have paid a good profit.

Edna Mines Co.—The Edna Mines Company, about eleven miles east of Idaho City, remodeled its 80-ton silver cyanide plant, which was built last year, during the early part of this year, but closed down after a brief run, on account of weather conditions, so it is reported by the management.

Whitman Mine.—The most consistent producer through

the year was the Whitman Mine at Pearl, having run its concentrating mill of twenty ton capacity at a good profit, continuously during the season.

New ore bodies have recently been discovered in the hanging-wall of the vein, formerly mined, which give promise of good results.

Granite State M. Co.—A small force has been operating on the Granite State Mining Company's property during the entire year, and it is reported that the development now justifies the installation of a mill.

I. X. L. Mining Co.—Nothing but assessment work has been carried on at the I. X. L. Mining Company's property during the year.

United Mines Co.—At the property of the United Mines Company owning the old "Kentuck Mine," nothing but repair work has been carried on, the shaft being re-timbered and gotten in shape for active operations in the future.

Centerville Mng & Milling Co., Monazite Sands—The Centerville Mining & Milling Company owning the only Monazite Sand plant in the state, operated during a greater part of the year upon gravel washed from placer deposits of the Boise Basin, near Centerville, and have accomplished very good results with their new magnetic separators, which were designed especially for this concern, but unfortunately their plant was destroyed during the summer by forest fires.

The valuable minerals obtained from these gravels were monazite and zircon. The most valuable element obtained from these minerals being thorium, for which there is a constant demand in the manufacture of incandescent, gas lamp mantels.

The gravel is hydrauliced into a sluice box, which passes by the milling plant, and grizzlies placed in the bottom of the sluice, permits the fine material to drop through. This fine material is elevated and passed over Wilfley Concentrating tables, the concentrated product from the tables is passed through a cylindrical drier, and then through a series of magnetic separators, and classified in accordance with their respective magnetic intensity.

The first separator having weak magnets, extracts the magnetite, which has no commercial value. The material is now free from this product, which constituted about 50 per cent of the total mass, is subjected to more intense magnetism, and the ilmenite and garnets withdrawn. The ilmenite has no commercial value at present, but owing to the large portion of titanium contained therein, will probably be used, at some future time, in the manufacture of high

grade steel, etc. The garnets are valuable for abrasive material. The next series of magnets separate the monazite sands. These sands, as produced in the plant, contain 5 per cent thorium and 50 per cent cerium and didymium, and have a commercial value of ten cents per pound of two hundred dollars per ton for the thorium contained, but the company contemplates the installation of a plant on their ground, for the manufacture of incandescent mantels, when much greater returns can be had from the same grade of material. The cerium and didymium contained in the monazite sands are valuable in the manufacture of a very high class smokeless flashlight powder, to be used in photographic work.

BONNER COUNTY

Practically no production was made in Bonner County this year, but considerable development work was prosecuted.

Idaho-Continental—At the Idaho Continental Mine a shaft has been sunk to the 500-foot level and the vein cross-cut but it was not sufficiently opened up to prove the ore bodies at that depth.

Weber Group—During the summer, the Weber group owned by the Standard Development Company has done a little more than assessment work on its property, which has been in litigation for a number of years.

Other properties in this county which have been developed in a limited way during the year are the Farmer Jones and the Rose of Killarney properties.

CASSIA COUNTY

The only properties operating in Cassia County during the past year were those on Connor Creek, about ten miles south of Albion, but very little substantial development has been accomplished, although there are several properties located in this district, which have very good surface showings.

CUSTER COUNTY

The much talked of railroad construction from Salmon City to Challis has failed to materialize this year, so nearly all of the mining properties in this county have remained inactive, the only production of any importance coming from the Sunbeam Mine, near Custer, and the White Knob at Mackay.

Sunbeam Mine—The Sunbeam Consolidated Gold Mines Company have completed a new mill building and have installed two new seventy-five ton per day, Monadnock Mills, giving the plant a total capacity of from three hundred to three hundred and fifty tons per day, with room in the new building for the installation of two additional mills.

The property contains a very large deposit of low grade, free-milling gold ore, that should be very profitable, if operated on an extensive scale.

Greyhound Mine—The Greyhound Mining and Milling Company operated its milling plant and smelter but two months this season owing to an extremely late spring and to the fact that it was found necessary to obtain additional flux before a successful reduction of the concentrates could be accomplished, and the plant closed down September 1st.

The Lost Packer Mine has developed continuously during the past year, but no attempt has been made to operate the smelter, awaiting transportation facilities, which will be within 40 miles of this property, if the railroad should be completed through from Salmon City to Stanley Basin.

The mine has been developed to a depth of approximately 1000 feet by a series of crosscut tunnels and drifts, and in the neighborhood of \$400,000 worth of ore is supposed to be blocked out already for treatment, the ore running, approximately \$85.00 per ton in gold, silver and copper values. The ore occurring as a very fine grained chalcopyrite, which breaks clean from the gangue.

Nothing further than development work has been accomplished in the Sheep Mountain and Seafoam districts, but it is reported that extensive developments is contemplated in the future.

In the Clayton and Bayhorse districts nothing of importance has been accomplished, although there is a report current that operations are to be undertaken in this section shortly on the supposition that the completion of the railroad from Salmon City is to occur this coming year. These districts contain properties with immense bodies of silver and lead ores, which have lain idle for years awaiting the coming of transportation.

The White Knob Mine owned by the Empire Copper Company, at Mackay, has been operated by leasers during the past year, approximately 834,000 pounds of copper, 24,000 oz. of silver, and 250 oz' of gold being produced. They have also accomplished 150 feet of sinking and some new ore bodies have been encountered, but their importance has not, as yet, been determined.

ELMORE COUNTY

Elmore County, which has always been a potent factor in the gold production of the State of Idaho, has fallen off materially during the past year, owing to the closing down of the Bagdad-Chase Mining Company's property.

Atlanta Mines Co.—During the latter part of the summer

considerable experimental work has been undertaken at the mill of the Atlanta Mines Company, but lack of timber and winter supplies has caused the management to close down the mine.

The ore is of a complex nature, occupying iron pyrite with considerable arsenic and antimony, which requires an extensive and costly process of treatment.

Minerva Mn'g Co.—The Minerva Mining Company's property, which lies south of the Monarch, has operated during the year very successfully, the milling plant having been doubled in capacity, to twenty stamps. The ore is quite different from the ores developed in the Bagdad-Chase and Monarch Mines, as it is extremely free, sixty percent of the values being saved in the battery and five percent in the sands upon the tables, the concentrates varying from \$100.00 to \$200.00 a ton. The ore occurs in a quartz filled fissure in granite and varies from two to ten feet in width. The mine is opened by tunnels, and additional depth can be economically obtained by driving a tunnel from the mill level.

Franklin Mine—The Franklin Mine at Pine Grove has been operating almost continuously through the past year and is reported to have made a very successful run.

Elmore Placer Co.—The only new enterprise of any importance undertaken in the last two years, in the county, is that of the Elmore Placer Company, controlled by Rupert Winters at Junction Bar, where he has been developing 320 acres of placer ground at the junction of the Feather River with the south fork of the Boise River.

The gravel is approximately forty feet deep and is to be operated by a combination hydraulic and dredge process. An immense pit has been excavated with a drain therefrom and a stationary bucket elevator installed to handle the material from the pit into a flume. The gravel is piped into the pit by the ordinary hydraulic process, the bucket ladder consists of close-connected buckets of $3\frac{1}{2}$ cubic feet capacity. Water from the Feather River is used for sluicing and that from Cayuse Creek, under a 175 foot depth, is used for piping.

FREMONT COUNTY.

No mineral production of any importance came from Fremont County during the year, with the exception of some little coal from the Teton Basin deposits, east of St. Anthony.

IDAHO COUNTY.

The mineral production of Idaho County consists almost entirely of gold and silver, which was derived from placer deposits along the Secesh and Salmon rivers, and from

some small mining operations in the old placer camps of Florence, Warren, Pierce and Elk City.

Crackerjack Mine—The Crackerjack Mine owned by the United Mines Company in the Buffalo Hump District, operated in a small way during the year while they were installing a new 5-drill compressor, preparatory to operating its 20-stamp mill next year.

There are numerous other prospects having good showings which have operated in a limited way in the OroGrande and the Big Creek Districts but upon which very little more than assessment work has been accomplished.

Newsome District—In the Newsome District no work has been carried on to any extent in the larger placer deposits in the Newsome and Moose Creek Districts, where immense deposits of gravel carrying fair values await the completion of a better water system to become productive.

The section of the country lying between the South Fork and the Middle Fork of the Salmon River, and containing the mining districts of Ramey Ridge, Big Creek and Profile Creek is deserving of mention, this district having been neglected in my last years report, owing to my inability to cover this section of the country.

These districts, in general, have very good surface showings which are worthy of systematic and extensive development, but which are so remotely located from transportation, that it is impracticable to attempt anything further than the annual representation at present, but if a railroad were constructed down the Salmon river, the mining cost would be so materially reduced that this section would offer an attractive field for further investigation.

In the Ramey Ridge district there are numerous properties carrying good size veins with very fair values in gold. The veins have been developed only at shallow depth but appear to be very strong and in some cases the ore is free enough to justify amalgamation, but in most cases additional metallurgical treatment will be necessary, and as depth is attained the ore will be, without doubt, quite refractory.

At Edwardsburg, on Big Creek, considerable prospecting has been carried on the last few years and a large mill erected, but this plant has not been completed owing to the inability of the management to secure supplies during the summer months and as the roads are passable, only during these months, the work has been abandoned for the winter.

About 15 miles further down Big Creek, at what is known as the Copper Camp, a very creditable showing has been made

in development on a series of parallel veins carrying chalcopyrite and a heavy iron gangue, which provided with cheap transportation would doubtless be productive as the ore carries a good contents of gold, reported to average about \$8.00 or \$9.00 per ton.

In the Profile District there are a number of properties carrying good lead, silver and gold values, which have been opened up during the past two years and look extremely promising and which will justify further development, but this district, also is greatly handicapped by the extremely high cost of supplies.

LEMHI COUNTY.

The completion of the Gilmore Road into Salmon City has given great impetus to mining in this section, although many of the properties are still some distance from transportation.

Gilmore Mine—The Gilmore Mine located at Gilmore, fifteen miles from the railroad station of Leadore, has been producing during the latter part of the year 5,472,000 pounds of lead, 115,200 ounces of silver, and \$4,650.00 gold.

The Mine has quite extensive ore reserves blocked out, but has not produced for a number of years owing to the high cost of transportation, but should pay a handsome profit with the completion of the railroad, as a branch line has recently been completed to a point within two miles of the mine.

Latest Out M. & Smelting Co.—Lying immediately adjacent to the Gilmore Mine is the Latest Out Mining & Smelting Company's property. Its production during the year was over \$130,000 in lead and silver.

There are a number of likely prospects in the neighborhood, which are deserving of systematic development but upon which very little has been done this year.

Salmon City Coal & Land Co.—The Salmon City Coal and Land Company have produced about 2000 tons of lignite coal deposits. This coal having a local market value of approximately \$7.00 per ton.

In the Yellowjacket and Rabbit Foot Districts considerable activity has been shown this year, owing to the reduced cost of transportation. Some of this development is likely to put these districts on a producing basis again, as new ore bodies have been developed and old ones opened up.

NEZ PERCE COUNTY.

Nez Perce County which has always been a large gold producer has experienced an extremely dull year, and very little new development work has been carried on, the most noteworthy probably being that of the Oxford Mining Company in

the Elk Creek District, where a copper showing has been developed during the past two years.

A vertical two-compartment shaft was sunk upon the vein but at a depth of 90 feet a fault was encountered which displaced the vein some 20 feet. The formation below this fault however is firmer and the vein which is 8 feet wide carries better values.

OWYHEE COUNTY.

The production of Owyhee county has been materially reduced this year, by the closing down of the Trade Dollar Mine, which has been a constant producer for many years. It having a record of considerably over twenty millions to its credit.

Trade Dollar Mine—This property was worked to a depth of approximately 2000 feet under the crest of the ore bodies, but the ore proved unprofitable at this horizon and the property has been abandoned.

This mine was operated by electric power furnished by the Swan Falls power plant, which is owned by this company and which has proven a valuable asset, for, with the closing down of the mine the power plant has been doubled in capacity and is furnishing current for the Interurban Railway line, between Boise and Caldwell, and also for municipal lights in Boise, Nampa and Caldwell. This is well to bear in mind as many other mining properties are similarly situated, so that the outlay in power installation, may not prove a loss even though the mine becomes exhausted, as the demand for electrical energy is constantly increasing.

DeLamar Mine—The DeLamar Mine has operated continuously through the year, adding another half million to its production. This property has maintained its output to a surprising extent, as it was supposed to be practically exhausted years ago, but the discovery of new ore bodies in the complex vein system has prolonged its life, but as the development of the lower tunnels failed to expose profitable ore its future is not very bright, but great credit is due the management for having prolonged its life to such an extent as has been accomplished.

Banner Mine—The Banner Mine which adjoins the Trade Dollar on the southeast and has been operating a small crew of men during the entire year exploring their vein through a lower tunnel, which was driven from the mill, but recently all efforts have been put forth in developing a rich shoot of ore, which was discovered on the 100 foot level. This has subsequently been opened on the 200 and 300 foot levels, and gives promise of producing a considerably quantity of gold as the ore is very high grade.

Nothing has been done on the War Eagle Mountain district, the district which made Silver City famous, having a production of approximately \$25,000,000. Considerable time has been spent in preparation for continuing the work undertaken in the Sinker tunnel, which will tap all of the veins in the War Eagle district at great depth, this having proven a failure in the past, owing to poor judgment in driving raises from the tunnel to tap the old Cumberland workings, which are full of water.

In the Flint district, the Perserverance Mining Co., has done considerable work in un-watering and developing the old property, which was originally opened by Fair, Flood and Mackay interests of California, in the early 70's. This property contains large bodies of grey-copper, carrying good silver values, but owing to the expensive metallurgical process necessary for its treatment, and the remoteness from transportation, has thus far prevented it from being profitable.

There are a number of other properties in this district having similar showings and with the invention of a suitable process will become productive.

SHOSHONE COUNTY.

Shoshone County continues to be the banner county of the state in fact nearly the total mineral production of the state comes from the Coeur d'Alene district of this county, having a total production, to date, of approximately \$210,000,000. The total mineral production of the state for the year was \$17,135,695.90 of which Shoshone County produced \$15,275,024.15.

This production is slightly in excess of last year, which was \$13,723,105, and as only two properties in the Coeur d'Alene District have been exhausted,—and they were worked to over 2,000 feet in depth,—since the discovery of the district in 1885, the future for this section is very bright, as all of the mines have as good ore bodies in the deepest workings as they have had in the upper.

The Bunker Hill & Sullivan has been developed over 3,000 feet in depth on the dip of the vein. The Standard and Mammoth approximately the same, the Morning about 2,700 feet, the Hecla and Hercules approximately 1500 feet each, all with no apparent diminution in the quantity or grade of ore.

Some very interesting geological conditions have been exposed in the Bunker Hill and the Morning Mines. In the Bunker Hill Mine, the vein in descending into the earth is substantially paralleling the bedding planes of the sedimentary series, in which all of the ore bodies of the Coeur d'Alene district occur. This is indicative of a long life for the property as ore bodies discovered within, either the Burke or the Rivett

quartzite, have been proven to be unlimited in downward extent but where the veins have occurred in the Pritchard slates, they have proven to be impoverished. This is particularly noticeable at the Morning Mine, where the upper levels were in the St. Regis formation, which is next higher than the Rivett in the series, and as depth has been obtained the workings have penetrated through the St. Regis into the upper Rivett and are now in what might be termed, the middle Rivett, and the ore which is being extracted from this horizon, is of much better grade than heretofore encountered, which was very intimately mixed with iron, making a close separation in milling impossible.

Morning Mine.—Immense sums of money have been expended in equipment and development at this property since it has been acquired by the Federal Mining & Smelting Company, the mill overhauled, additional machinery added, saw-mill, machine shops, hotel for the employees, and all other necessary buildings added to make it one of the most complete plants in the district. The mine and mill are equipped with electricity. Electric haulage is used underground. From the mill a tunnel has been driven—being approximately 10,000 feet long—to the vein, where it is connected with the upper workings. At this point, a large hoisting station, openings for ore-bins and room for boilers to re-heat the air, which is to be used in the hoist, have been excavated, making it probably the most complete and extensive underground hoisting stations in the country. A shaft has already been sunk to the first level 250 feet, by an auxiliary hoist but the main hoist has not, as yet, been installed. This latter hoist, which is to be used in the permanent equipment is the one formerly employed in the Tiger-Poorman Mine. It is a first-motion, Corliss type hoist with 60 in. stroke, capable of hoisting from a depth of 2500 feet.

This hoist which was formally operated on steam is to be run, in the new arrangement, by air furnished from water driven compressors, outside of the mine, to be re-heated by passage through tubular boilers, under which a small fire is maintained, before going to the hoist. The air is passed in through the mud drum of the boiler and out of the steam dome as if it were steam, and a check valve is provided in the air line before it enters the boiler, so that if the air pressure fails an additional fire under the boiler supplies the necessary power for the hoist. This plant, to be installed at the Morning Mine, will be practically a duplicate of the one at the Mace Mine of the Federal Mining Company, which has been in operation for the past two years, and which has been making a sav-

ing of approximately \$2000.00 a month, over the cost of operating, where coal was used to generate steam to operate the hoist.

Recently a sorting plant has been installed at The Morning Mine and for the first time in the history of the mine, first class ore is being shipped direct to the smelters. This improvement, combined with the better grade of ore encountered on the lowest levels of the mine, is very encouraging for a bright future, as the property has paid very little profit for some time owing to the large amount of improvements and experimental work being carried on at the mill, and the poor grade of ore being extracted, but during the past few months this has been materially changed and there is no reason to believe otherwise, than that the property will be a very remunerative investment from now on and it should have a long life.

Hunter Mine—The Gold Hunter Mining and Smelting Company have operated continuously through the season and have been able to make a greater production than during the past few years. They have also carried on extensive development work in the lower level, having opened up better ore bodies at this depth, than have been encountered heretofore. This property has always been handicapped by lack of substantial and systematic development and only within the past two years, since the completion of their lower tunnel, has the property been intelligently handled and the result is that the property is now paying a nice profit, which has not been the case in the past.

Snowstorm Mine—The Snowstorm Mine, located about three miles above Mullan, the only copper producer of the district—outside of the Caledonia Mine, at Wardner, which produces copper as a by-product—has fallen a little short of its production of the last two years, but still has large reserves of low grade ore, from which it can maintain a production for considerable time to come, but no new ore bodies have been developed in the lower tunnel, where extensive development work has been carried on continuously. This is accounted for by the fact that the large fault which terminated the ore bodies in the upper levels has continued to great depth. Undoubtedly this fault was a very potent factor in the deposition of the ore, and it is more than likely no commercial ore will be encountered beyond this fault. The “bottoming” of this deposit which is in great contrast with the other ore bodies of the Coeur d’Alene District, which are extremely deep rooted is not to be wondered at, on account of the very nature of the deposit, and it is not to be classed with any of the other occurrences in the district, as the Snowstorm vein is essentially a bedded

vein, while all the other producing mines carry veins of the fissure type, cutting the bedding planes of the formation, though in some cases the vein conforms very closely in dip and strike to that of the country rock.

Alice Mine—The Alice Mine, located between Wallace and Mullan has operated during the greater part of the year, under a lease, and has made a very creditable showing, considering the small plant and the amount of development.

Hercules—The Hercules Mine at Burke has produced continuously through the year and has a considerably larger production to its credit than last year and a trifle larger than 1908, although the operations have been materially handicapped by the disorganization of milling operations, caused by the loss of its milling plant during 1909, and the delay necessary in the equipment of the old Tiger Mill, which has been used during this season. The company, however, is constructing a 500 ton mill in the lower edge of Wallace. Some of the machinery from the mill lost by fire, and machinery now in use at the Tiger Mill are to be used. The mill is to be of strictly modern design, all the ore to be handled by railroad cars from the mine to the mill, approximately eight miles, but the advantage of having ample room for a tailings-dump will be gained. The mine is in an elegant state of equipment and development, very little impression having been made upon the ore reserves during the past year.

Hecla Mine—The Hecla Mine also at Burke has maintained approximately the same production as last year, the only noticeable difference being that the ratio of silver to lead is slightly on the increase. During the year the shaft has been sunk to the 1200 foot level and the ore shoot developed at that depth. This ore shoot is as strong and of better grade if anything than that encountered on the 900 foot level, and the mine has large ore reserves available. No material change in the equipment has been made, but it is worthy of mention that the electric hoist described in my 1909 report has operated satisfactorily throughout the season.

Mace Mine—At Mace the production for the year has been materially less than former years owing to the delay occasioned by the snow-slides last winter and the loss by fire of the ore bins and sorting plant near the first of the year, it being necessary to use improvised ore bins and only during the last few months has the new plant been completed. The ore passes over sorting belts, is washed and hand sorted, the first class ore being shipped direct instead of passing through the mill, thus making a great saving, which is estimated as be-

ing between ten and twelve thousand dollars per month, and the second class ore goes to the mill.

The heating plant installed at this property last year has been materially improved. The boilers used in re-heating the air, which were formerly stationed outside of the mine, have been moved into the hoist station, approximately 3000 feet from the portal of the tunnel. The boilers have been covered with a heavy asbestos coating, the smoke from the combustion of the slab wood, which is used for heating, is conducted with the exhaust from the hoist into some old stopes, and is thus carried off by the natural ventilation of the mine, no injurious affects being noticed at all.

The air, which is furnished by electric driven compressors stationed outside of the mine, is passed in at the mud-drum of the boiler and goes to the hoist from the steam dome, a fire is maintained sufficient to keep the water in the boiler at a temperature nearly as high as though steam were being generated, but very little fuel is necessary, as the pressure is constantly maintained by the air from the compressors. A check valve is provided in the air line so that, in case the air pressure should fail, additional fire could be placed under the boiler and the hoist operated by steam. It is found that the hoist operates equally as well on air as on steam and has a very distinct advantage in that a great saving is made in the cost of operation, amounting to approximately \$2000.00 per month. This arrangement could be very profitably adopted by other operators, where cheap electric power is available, and where it is necessary to transmit the air a considerable distance, as the equipment necessary, represents a very much less outlay than where the power is directly applied to the hoist in large hoisting plants, such as is in use at the Hecla.

The mine is now developed to a depth of 1850 feet below the collar of the working shaft, which is 1350 feet under the apex of the vein, giving a total depth of development of the vein of 3200 feet. The ore bodies at this depth, while leaner on the east end, have maintained their values through the major portion of the ore shoot, and ore of as high grade as has ever been encountered in the mine is found on the lowest level developed. This is extremely encouraging when the depth to which the mine has been developed is taken into consideration, and a long life is insured for the mine.

The Bunker Hill and Sullivan at Wardner has maintained its phenomenal production throughout the year, having produced approximately 70,000,000 pounds of lead and 1,245,000 ounces of silver.

An additional unit of 500 tons daily capacity is in course

of construction, and when completed, will give the property a milling capacity of approximately 2000 tons per day.

The immense ore bodies of the mine have been developed at additional depth, giving immense ore reserves for years to come. The one very interesting feature of recent development is that the dip of the vein nearly conforms to the bedding planes of the formation, so that great depth can be obtained before the vein will have passed out of the Rivett and Burke quartzite, in which all of the rich ore bodies of the district occur, so that a long life is assured for the mine.

A shaft has been sunk and levels opened up to a depth of 1200 feet below the lowest tunnel level, developing the vein considerable over 3000 feet on its dip, beneath the apex.

Federal M. & S. Co.—The Wardner Mine of the Federal Mining & Smelting Company, formerly known as the Last Chance property, adjoining the Bunker Hill has operated continuously under the management of the Federal Company. The litigation which has been pending for several years, between the Federal and Bunker Hill Companies has been settled, the Bunker Hill Company securing title to all claims formerly owned by the Federal Company in this immediate section, the Federal Company retaining possession of the Last Chance Mine from which they are permitted to extract ore until the ore bodies are exhausted. The Bunker Hill Company in return for same giving the Federal Company a large block of stock in its company. This puts an end to the expensive litigation, which has hampered the industry in this district ever since the early days, and the large sums of money expended in litigation work can now be paid dividends. The only redeeming feature in favor of the litigation work was that it required a very careful, detailed, geological examination of the vein systems and ore deposits, which in many cases have been very beneficial.

During the past year new ore bodies have been discovered in the Last Chance Mine and with the low grade ore bodies already known, the property will be capable of producing for a long time to come.

Caledonia—The Caledonia Mine lying adjacent to the properties of the Bunker Hill and Sullivan and the Federal Mining Company, but on an entirely distinct vein system, has made the most phenomenal record of any property discovered in the Coeur d'Alenes, since the Hercules. This property, which was located in 1885, the same year that the Bunker Hill & Sullivan was discovered, laid idle up to three years ago, aside from the annual representation, and owing to the meager geological knowledge of the district, attracted little attention,

but its development has demonstrated the likelihood of a number of similar vein systems being developed in the district.

The ore which is of unusual high grade in lead and silver, carrying also a very important contents of copper, has been developed to a depth of 500 feet by an inclined shaft, equipped with an electric hoist. All ores thus far produced have been hand sorted and shipped direct, the company having no milling facilities, but with the completion of a long tunnel from Deadwood Creek, which will tap the vein several hundred feet deeper than the bottom of the shaft, ore can be handled directly to the railroad, at a greatly reduced cost of operation. This also will afford the advantage of permitting the milling ore to be treated as extracted from the mine, so that the profits of the company should be materially increased in the future.

Stewart Mine—The Stewart Mine, which lies to the northwest of the Caledonia, has produced during the major portion of the year, its ore being handled by rail to Wallace, where it is milled in one of the units formerly used by the Mammoth Mine. Active development has been carried on and large reserves of milling ore put in sight. This property is also upon a vein system separate and apart from any of the others developed in the district, but the character of the ore more nearly conforms to the main Wardner vein system, than that of the Caledonia.

Tamarack Mine—The Tamarack and Chesapeake Mine located on Nine Mile Creek has remained idle through the entire year owing to disagreement of its principal owners, but I am informed that recently all disputes have been settled and that next year the property will be operated, a mill constructed and the large reserves of high grade ore developed in this property mined.

Silver-Lead Mine—The Silver-Lead Mining Company, controlling the old 16 to 1 property, also on Nine Mile Creek, have been doing extensive development work during the season and a small quantity of first class ore has been shipped.

A working shaft has been sunk to the 300 foot level below the lowest tunnel, and it is reported that good ore has been developed at this horizon.

Callahan Mine—The Callahan property, also located on Nine Mile Creek, has done considerable shipping during the past year, but the ore body has not, as yet, been opened on the lowest level.

Surprise Mine—The Surprise Mining Company, the only producing property located on Pine Creek, southwest of

Wardner, has shipped considerable ore during the past year, but has not operated continuously.

This property is located some ten miles from the railroad and has been materially handicapped for that reason.

WASHINGTON COUNTY.

Washington County in keeping with nearly all other counties in the State has been almost inactive in a mining way during the year, practically nothing but representations of the properties being accomplished. The large undertakings which were contemplated for this year, by the Salt Lake Copper Company, which was supposed to be backed by the Lewisohns, fell flat and nothing of any importance accomplished.

The large power project at Ox Bow, on Snake River, has been at a standstill during the major portion of the year, but I am informed that one unit of this plant will be completed as soon as possible. This latter enterprise should materially stimulate the mining industry in the Seven Devils District, as it will furnish cheap power, which has made many a mining district profitable, where otherwise they could not be operated.

METAL PRODUCTION FOR 1910.

Ada County.

Gold, fine ozs., 114.90.....	\$	2,374.98
Silver, fine ozs., 266.26.....		142.18
Total value.....		2,517.16

Bannock County.

Gold, fine ozs., 83.24	1,720.47
Silver, fine ozs., 0.28.....	.15
Total value.....	1,720.62

Bingham County.

Gold, fine ozs., 48.341.....	999.21
Silver, fine ozs., 16.34.....	8.72
Total value.....	1,007.93

Blaine County.

Gold, fine ozs., 600.0.....	12,402.00
Silver, fine ozs., 39,766.7.....	21,235.42
Lead, lbs., 113,143.0.....	5,091.43
Total value.....	38,728.85

Boise County.

Gold, fine ozs., 8,505.4.....	175,806.62
Silver, fine ozs., 8,714.0.....	4,653.27
Total value.....	180,459.89

Bonner County.

Gold, fine ozs., 100.23.....	2,071.75
Silver, fine ozs., 30.07.....	16.06
Total value.....	2,087.81

Canyon County.

Gold, fine ozs., 3.602.....	74.45
Silver, fine ozs., 0.68.....	.36
Grand Total.....	74.81

Cassia County.

Gold, fine ozs., 64.86.....	1,340.65
Silver, fine ozs., 0.325.....	.17
Total value.....	1,340.82

Custer County.

Gold, fine ozs., 2,800.4.....	57,884.30
Silver, fine ozs., 24,614.4.....	13,144.10
Copper, lbs., 834,000.0.....	107,586.00
Total value.....	178,614.40

Elmore County.

Gold, fine ozs., 10,023.46.....	207,184.90
Silver, fine ozs., 14,104.7.....	7,531.90
Total value.....	214,716.80

Fremont County.

Gold, fine ozs., 47.124.....	974.05
Silver, fine ozs., 0.48.....	.26
Total value.....	974.31

Idaho County.

Gold, fine ozs., 1,235.5.....	25,537.80
Silver, fine ozs., 763.3.....	407.60
Total value.....	25,945.40

Lemhi County.

Gold, fine ozs., 1,192.3.....	24,644.84
Silver, fine ozs., 209,413.6.....	111,826.85
Lead, lbs., 9,071,921.0.....	408,236.44
Total value.....	544,708.13

Lincoln County.

Gold, fine ozs., 7.974.....	164.82
Silver, fine ozs., 0.37.....	.20
Total value.....	165.02

Nez Perce County.

Gold, fine ozs., 2,437.9.....	51,135.51
Silver, fine ozs., 612.7.....	327.18
Total value.....	51,462.69

Oneida County.

Gold, fine ozs., 52.163.....	1,078.20
Silver, fine ozs., 19.84.....	10.60
Total value.....	1,088.80

Owhyee County.

Gold, fine ozs., 18,696.33.....	386,453.14
Silver, fine ozs., 319,236.70.....	170,472.40
Total value.....	556,925.54

Twin Falls County.

Gold, fine ozs., 73.215.....	1,513.35
Silver, fine ozs., 3.93.....	2.10
Total value.....	1,515.45

Shoshone County.

Gold, fine ozs., 3,110.....	64,283.70
Silver, fine ozs., 7,262,271.....	3,813,579.62
Lead, lbs., 229,950,506.....	10,348,177.80
Copper, lbs., 5,003.639.....	645,469.43
Zinc, lbs., 5,995,600.....	333,513.60
Total value.....	15,275,024.15

Washington County.

Gold, fine ozs., 56.3.....	1,163.70
Silver, fine ozs., 202.35.....	108.05
Total value.....	1,271.75

Totals for the State.

Gold, fine ozs., 49,289.22.....	1,018,808.20
Silver, fine ozs., 7,890,388.00.....	4,268,813.00
Lead, lbs., 239,144,570.00.....	10,761,057.70
Copper, lbs., 5,837,639.00.....	753,055.40
Zinc, lbs., 5,995,600.00.....	333,513.60
Grand Total for 1910.....	\$17,135,695.90
Grand Total for 1909.....	15,606,862.15
Increase	\$ 1,528,833.75