Thirty-eighth Annual Report
of the
Mining Industry
of Idaho
For the Year
1936

ARTHUR CAMPBELL
Inspector of Mines
Boise, Idaho
THIRTY-EIGHTH
ANNUAL REPORT

OF THE

Mining Industry
of IDAHO

FOR THE YEAR
1936

ARTHUR CAMPBELL
Inspector of Mines

MARIE P. CARROLL
Secretary
LETTER OF TRANSMITTAL

To His Excellency,
THE HONORABLE C. BEN ROSS,
Governor of Idaho.

SIR:

In compliance with the provisions of Section 46-111, Idaho Code Annotated, I have the honor to transmit herewith the annual report of the inspector of mines for the year ended December 31, 1936.

Respectfully submitted,

ARTHUR CAMPBELL,
Inspector of Mines.
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FOREWORD

This is a report of the mining industry for the year ending December 31, 1936, as well as information on the mineral resources of the state and the capital structure of companies doing business in Idaho. The form and general arrangement of the former reports are retained as they have proven to be very satisfactory in the past. The mailing list is growing from year to year and the demand for copies is furnished on request, without charge, until the supply is exhausted.

It is the only publication dealing with general mining activities issued for distribution by the department. In fact, it is more of a handbook than a formal report and serves as an advertising medium for the industry in the State. In the past these reports have proven exceedingly valuable, not only to operators and engineers, but to prospective investors, and every effort should be made to continue their publication and to make them as complete as possible.

The present price of gold with the government's program to purchase newly mined silver, and the increased demand and price advances for the base metals, had a stimulating effect on mining in Idaho. This resulted in more employment, better wages, new machinery and equipment, larger orders for supplies, greater consumption of foodstuff and increased tonnage on incoming and outgoing freight. Mining on the whole had a successful and prosperous year with an optimistic view for a banner year during 1937.

In line with our safety first program we are reprinting in this issue suggestions and advice on safety that we hope will cut the avoidable accidents to a minimum, and by numerous requests, information that will be advantageous to those contemplating the search for minerals this year and in the future.

We are fortunate to have special articles pertaining to the work and accomplishments of several departments and contributions from members of the mining fraternity that contain material of special interest to the mining public. We take this opportunity to thank the following for their co-operation and contributions:

Dr. A. W. Fahrenwald, Dean of the Idaho School of Mines and Director of the Idaho Bureau of Mines and Geology;
Mr. John T. Carpenter, President, The Idaho Gem Club;
Mr. E. M. Norris, Superintendent, Anaconda Copper Mining Company, Fertilizer Department, Conda, Idaho;
Dean E. J. Iddings, Director, College of Agriculture, University of Idaho;
Idaho Planning Board, J. D. Wood, Consultant; H. P. Taylor, Director of Research;
Mr. James Wilson, Director, Central Mine Rescue Station, Coeur d'Alene Mining District;
Dr. Philip J. Shenon, member of the U. S. Bureau of Mines Staff;
Mr. James W. Gwinn, Mining Engineer, Secretary, Idaho Mining Association;
Mr. W. G. Woolf, Superintendent, Sullivan Electrolytic Zinc Plant;
Mr. Julius P. Hall, Mining Engineer, Wallace, Idaho;
Mr. Reid W. Allen, Former Director of Aeronautics Division, State of Idaho;
Idaho State Departments;
U. S. Bureau of Mines;
State Chamber of Commerce.

Every effort has been made to co-operate with the various bureaus and departments for the best interests of the State and the mining industry.

Corporations that have forfeited their charters, and have failed to file their reports as required by law, have been considered as legally dead; therefore no mention is made of them.
FORERWORD

PROSPECT LISTS

Many of the prospects were worthy of more prominent mention, but it was impossible to give more than the owner's name and address, name of mine and its general location, because the owner did not file any report with the Inspector. The furnishing of detailed information by owners of prospects not only assisted in displaying the mining possibilities of Idaho, but often proved an attractive advertisement of the property. Blank forms for reports were always furnished to individuals requesting them. We hope to bring the prospect lists up-to-date in our report for 1937 if the appropriation for the next biennium is sufficient to cover this much needed improvement.

BIBLIOGRAPHIES

Much information concerning the geology, mineralogy, and mineral resources of Idaho has been collected and published by the U. S. Geological Survey, the U. S. Bureau of Mines, and the Idaho Bureau of Mines and Geology. Much is also contained in the various reports of the Inspector of Mines and in journals dealing with mining and geology. In order to make this information readily available to the public, this material has been indexed according to counties and subjects and published in the report. The indexing has been kept up to date, and so far as is known, each county bibliography contains references to all material of any importance that has ever been published concerning the county. Publications relating to specific minerals found in the State are listed also under the "General Bibliography." The usefulness of the Bibliographies has been further increased by including publishers' addresses and information as to whether each particular reference can be procured or not. Symbols have been added as a guide to facilitate explaining this information. Most of the publications listed are found in the Inspector's library. These publications may also be consulted in all large libraries.

NEWSPAPERS

The visits which the Inspector has made to the numerous counties are necessarily so short that they were inadequate to enable him to keep directly in touch with all mining activities, so that it was necessary to supplement his personal information by that gleaned from the press. Some of the publishers located in mining communities furnished gratuitous subscriptions of their newspapers to the office of the Inspector. This courtesy was greatly appreciated and was of much assistance in enabling the Inspector to keep abreast of the mining news. Accordingly, the State of Idaho, through the Inspector of Mines, extends its thanks to the following: Arco Advertiser, Kootenai Valley Sentinel, Idaho Labor, Mackay Miner, Mullan News, Northern Idaho News, News from The Mines, Western Mineral Survey, Wallace Miner, Wallace Times and Weiser Signal.

MINERAL MARKET INFORMATION

As there has continued to be a demand for possible markets for uncommon minerals and metals, the list prepared, which includes the names and addresses of the purchasers or users, were revised and kept up to date as nearly as it was possible to do so.

LIBRARY

The library is believed to be the largest of its kind in the state. It contains nearly every publication of the U. S. Geological Survey and U. S. Bureau of Mines, most of the U. S. Mint Reports, numerous volumes published by the geological surveys of other states, and many volumes of journals dealing with mining and geology.

The following magazines are regularly received: Business Week; Du Pont Magazine; Economic Geology; Engineering and Mining Journal; The Engineer's Bulletin; The Explosives Engineer; The Mining and Contracting Review; The Mining Congress Journal; The Mining Journal and Northwest Mining. Complete files of these magazines have been preserved for reference use.
Visitors are always welcome to consult the books of the library or to read the magazines. In the absence of the inspector, the secretary is glad to assist visitors in finding desired information.

MINING LAWS

The Inspector's office has generally published and distributed the mining laws since the office was established. The last authorized issue was printed and distributed in 1931. This was made possible by an Act of the Twenty-first Session of the State Legislature making an appropriation to the office of Inspector of Mines to cover compilation, printing and distribution.

Many requests come to this office for copies of the mining laws. The most frequent are relative to mining locations, safety first provisions and what will and will not count as annual labor. At present we have mimeographed copies of certain sections and general interpretations of the law for distribution.

We sincerely hope that the Twenty-fourth Session of the State Legislature will make it possible for this department to authorize a compiled issue of Mining Laws that is needed so much for distribution to the general public at the present time.

MINERAL EXHIBIT

Many new specimens were added to the splendid collection of minerals on exhibit in the rotunda of the Capitol Building.

During the year the Atlas Powder Company placed on display a cabinet of explosives and blasting accessories manufactured by the Atlas company.

Through courtesy of the Bunker Hill and Sullivan Mining and Concentrating Company a flow sheet of the South Mill and a pictorial flow sheet of their lead and zinc concentrator were presented to the department and placed on display with the other exhibits in the rotunda.

The Idaho Gem Club have a fine collection of semi-precious gems and other specimens in a glass case on display that is proving of more than passing interest to visitors. If the Club should decide to make this a permanent fixture at the state house it would most certainly be an added attraction to the mineral exhibit and sincerely appreciated by the mining department.
IDAHO

Idaho ... the Gem of the Mountains ... land of towering peaks and mighty canyons ... of forested slopes and sage brush plains ... of rushing, gleaming, cascading rivers and deep blue mountain lakes ... of the white syringa and the purple sage ... of lava wastes and irrigated gardens ... of trout and deer ... of sheep and cattle ... of bountiful crops and rich mines.

Ee-dah-how ... the sun is coming down the mountain! Ee-dah-how ... the peak is glittering under the morning rays! Ee-dah-how ... dawn is in the valleys, dew is on the syringa! Ee-dah-how ... Idaho ... thus the Indians named her.

ORGANIZATION

Idaho Territory was organized March 3, 1863, out of parts of Washington, Nebraska, and Dakota territories, with Lewiston the capital, and William H. Wallace the governor. The new Territory contained four counties, ten mining towns, and 20,000 people.

The territorial capital was removed from Lewiston to Boise, in May, 1865, by United States Marshal J. H. Alvord, under orders from Washington, D. C.

Idaho was admitted into the Union as the forty-third state, July 3, 1890. The first state governor was William J. McConnell.

Idaho contains 83,354 square miles and has forty-four counties. Population (1930 Census) 445,032.

STATE CAPITOL

Erected 1906; cost $2,290,000. Outside walls are faced with Boise sandstone. Corridors, floors, wainscoting, and base throughout the building are of Vermont marble. Covers an area of 50,646 square feet.
STATE FLAG

The official flag stands in the office of the Governor of Idaho. State Flag: A silk flag, blue field, 5 feet 6 inches fly; 4 feet 4 inches on pike, bordered by gilt fringe 2½ inches wide; with the State Seal of Idaho reproduced in the center of the flag. The words "State of Idaho" are embroidered in gold block letters two inches high on a red band, the band being embroidered in gold and placed about 8½ inches from lower border of fringe.

STATE SEAL

The Great Seal of the State, replica of which is embroidered in colors in the center of the flag, came into existence in 1891, by act of the first State Legislature. The translation of the Latin motto on the seal, "Esto Perpetua," is "It is perpetuated," or "It is forever." The river depicted in the shield is our mighty Snake River, a stream of great majesty.
STATE PARKS

Idaho has four state parks. Heyburn State Park, on Lake Chatcolet, is a beautiful forest and lake park, west of St. Maries.

Spalding Park, near Lapwai, marks the spot where the Reverend Henry H. Spalding set up the first mission 100 years ago. The first home, the first printing press, the first church, and the first school were established by Spalding, in 1836.

Packer John Cabin Park, near New Meadows, was established to commemorate one of Idaho’s earliest citizens, Packer John, who carried pack between Grangeville and Boise Basin in the sixties. The first Democratic territorial convention was held in Packer John’s Cabin.

Shoshone Falls Park includes the grounds around Shoshone Falls on Snake River, north of the city of Twin Falls.

STATE FLOWER—SYRINGA

The syringa (Philadelphus lewisii) was designated the state flower of Idaho by legislative enactment on March 2, 1931.

It is a branching shrub with clusters of white, fragrant flowers. The blossoms are similar to the mock orange; has four petals and the flowers grow at the ends of short, leafy branches.
STATE BIRD—MOUNTAIN BLUEBIRD

The Mountain Bluebird (Sialia arctica) was designated as the state bird for Idaho by the Legislature, February 28, 1931.

OUR IDAHO

You've heard of the wonders our land does possess,
Its beautiful valleys and hills;
The majestic forests where nature abounds,
We love every nook and rill.

CHORUS

And here we have Idaho,
Winning her way to fame;
Silver and gold in the sunlight blaze,
And romance lies in her name.
Singing, we're singing of you,
Ah, proudly, too, all our lives thru
We'll go singing, singing of you,
Singing of Idaho.

There's truly one state in this great land of ours,
Where ideals can be realized;
The pioneers made it so for you and me,
A legacy we'll always prize.
The White Pine King was the largest Idaho White Pine tree known to have been grown in Idaho, of which record is available.

It grew in Latah County, near Bovill. The White Pine King was cut December 12, 1911; height, 207 feet; diameter, 6 feet 9 inches.

It scaled 28,900 board feet; enough lumber to build about two average-sized 5-rm. houses. White Pine King was 425 years old when cut.

STATE TREE—WHITE PINE

The White Pine (Pinus Monticola) was designated to be the state tree of the State of Idaho by the Legislature, February 13, 1935.

Idaho has the largest body of virgin white pine in the world.
Some Outstanding Dates in Idaho History

1805—Expedition led by Lewis and Clark camped on Lemhi River, near Salmon City.
1834—Fort Hall, built by Captain Nathaniel Wyeth, near Blackfoot.
1843—First highway across Idaho was the Oregon Trail, which entered near Montpelier, passed by Fort Hall.
1853—Cataldo Mission, built by Indians, under supervision of Jesuit Missionaries. Located on Coeur d'Alene-Yellowstone Trail.
1863—March 3, Idaho Territory organized.
1863—First quartz claims of high grade gold ore located in Boise Basin.
1863—First treaty with Shoshoni Indians at Fort Bridger, Utah.
1863—Boise barracks established on Mores Creek, and cavalry brought in for protection from Indians.
1864—Mail stage coaches began bringing mail from Salt Lake via Fort Hall, to Boise and Walla Walla, Washington.
1865—Territorial capital removed from Lewiston to Boise.
1866—Gold discovered at Leesburg, in Lemhi County.
1867—Masonic Grand Lodge established at Idaho City.
1869—Statue of George Washington, carved from native wood by Charles Ostner, was unveiled on capital grounds.
1869—Union and Central Pacific railroads completed as far as Kelton, Utah, with stage connection into Idaho.
1869—Fort Hall Indian Reservation set aside by President Grant for Shoshoni and Bannack Indians.
1870—First census of Idaho was taken, showing a population of 14,999.
1873—Coeur d'Alene Indian Reservation set aside by President Grant for Coeur d'Alene and Spokane Indians.
1874—First railroad to enter the Territory was the Utah Northern, a narrow gauge, built to Franklin, Idaho.
1875—Lemhi Indian Reservation set aside by President Grant for Shoshoni, Bannack and Tukuarika Indians.
1877—Nez Perce Indian war; June 17, Battle of White Bird Creek Canyon.
1879—Mormon people began settlement in Snake River Valley, near Idaho Falls.
1880—Placer gold discovered in the Coeur d'Alenes.
1880—Lead-silver mines opened in the Wood River district.
1881—First daily paper published at Hailey, Idaho, by T. E. Picotte.
1883—Northern Pacific Railroad completed across panhandle.
1883—Grand Lodge of Odd Fellows established at Boise.
1884—Lead mines of the Coeur d'Alene region, which developed into the greatest lead-producing region in the world, discovered.
1884—Oregon Short Line railroad completed across southern Idaho.
1885—First capitol building to be constructed at Boise, voted by Legislature, to cost $80,000.
1889—January, University of Idaho was established at Moscow, six months before Idaho was admitted to statehood.
1890—July 3, Idaho was admitted to the Union as a state.
1890—First session of the State Legislature met at Boise December 8.
1896—Idaho became the first state in the Union in lead production.
1903—Chicago, Milwaukee & St. Paul Railroad was extended to cross northern Idaho.
1907—William E. Borah elected United States Senator.
Gold Mines of Central Idaho

Published by Permission of the Director, United States Geological Survey

By PHILIP J. SHENON

The United States Geological Survey has carried on investigations in Idaho from time to time for many years. Much of this work has been supported jointly by the Idaho bureau of Mines and Geology and the Federal Survey. In the past six years, such cooperative investigations have been focused largely on gold mining districts in the central part of the State, which may be defined loosely as the extensive area stretching from the Snake River Plains on the south to the vicinity of Pierce north of the Salmon River.

Much work remains to be done before an adequate picture of the mineral deposits of this vast and rugged region is evolved. Considerable progress has already been made, however, and the following few pages present in outline some of the generalities that may be drawn from a consideration of reports already published and those now in preparation.

Some of the broad geologic features of central Idaho are first discussed with emphasis on the relation to them of several types of mineral deposits. This discussion is followed by a brief history of mining, including something about the current activity in the area. The article closes with some hints as to what may be expected from central Idaho in the next few years.

Much of central Idaho is occupied by the Idaho batholith, a huge mass of granitic rocks more than 300 miles long and 70 miles wide. The rocks of the batholith were intruded into already folded masses of older sedimentary rocks, chiefly quartzite, gneiss, and schist, which then became further altered and deformed. In many places thick series of lava flows and related rocks rest on the deeply eroded surface of the batholith.

Many gold-bearing quartz veins are in the batholith or in the nearby surrounding rocks.

At Elk City the veins, which are largely in the wall rocks of the batholith, radiate around a body of granodiorite and occupy fractures that cut the schistosity of the rocks at nearly right angles to the direction in which certain elongate minerals point. This type of fracture is commonly persistent, but the quartz along the fractures is generally in a series of lenses that are not continuous. Thus, if a lens pinches out either horizontally or vertically, and the fracture is well defined, the miner should not be discouraged until he has prospected a reasonable distance farther, for other lenses may lie beyond.

In the Buffalo Hump district no such relationship exists between the direction of elongate minerals and the veins. There the veins lie near the crest of an overturned anticline that has been partly engulfed by granitic rocks. The veins trend north and are in both schist and granite. The veins are large and have persistent outcrops, and in places are of good grade.

Many of the veins of the Tenmile district along and near the South Fork of the Clearwater trend easterly across the general strike of the prevalent gneiss, schist, quartzite, and granitic rocks. The Lone Pine mine, at Golden, follows parts of several typical veins of this district and has been an important producer of gold for several years.

Near Warren gold-bearing veins occupy well-defined eastward-trending fractures in the Idaho batholith. In general the veins are small, but some are of very high grade.

The Golden Anchor mine, in the Marshall Lake district, has recently been one of the principal producers of gold in Idaho. In that district the quartz veins are largely in roof pendants of quartzite near the top of the Idaho batholith.

In contrast to the gold-bearing quartz veins such as those described above, there are wide mineralized shear zones. Near Edwardsburg, shear
zones 200 feet to 300 feet wide have been intensely silicified and contain small amounts of widely disseminated sulphides and gold. In places the gold content probably ranges from $1.00 to $5.00 per ton. The task of correctly sampling such deposits is difficult, and as yet little is known of their gold content except that in general it is low.

An important relationship brought out by Geological Survey work in the Edwardsburg district is the close connection between the gold deposits and zones containing numerous dikes. The dikes, and therefore the deposits as well, are younger than the Idaho batholith.

The lodes in the Boise Basin and in the vicinity of Atlanta are related to shear zones, faults, and fractures in the Idaho batholith and in closely-spaced dikes that cut the granitic rocks. Individual shoots are of small or moderate size, and, with a few exceptions, are not of high grade. Nevertheless, they have contributed largely to the gold produced by Idaho in recent years and, in aggregate, they constitute a considerable reserve.

At the Meadow Creek mine, near Yellow Pine, the ore is found along a wide silicified shear zone in the Idaho batholith. This shear zone appears to extend for at least 2 miles, although ore is found only in shoots or in irregular bodies in it. The best ore is on the foot-wall side of a curved diabase dike. The gold content of this ore is reported to range from 0.15 ounce to 0.5 ounce per ton, and its antimony content in the mill heads from $1.5$ percent to 3 percent.

Another wide mineralized shear zone is being mined near Orogrande. It is largely in schist and is less silicified than the shear zones near Edwardsburg and Yellow Pine. During the period 1902-1909, when gold sold for $20.67 an ounce, the gold saved from the ore of this zone at the Butte and Orogrande mine ranged by years from $0.80 to $4.80 per ton.

The Dixie district has not yet been examined by the Geological Survey, but a hasty trip to that vicinity indicates that some of the deposits there are of the shear-zone type. It is noteworthy also that many dikes apparently similar to some of those in the Edwardsburg and other districts are common near Dixie.

The ore deposits of the Thunder Mountain and some other districts are in the lava flows and related rocks that rest on the eroded surface of the Idaho batholith.

At Thunder Mountain the deposits do not form veins but replace certain parts of the volcanic series. For example, the Sunnyside ore body is blanketlike and lies below a pre-mineral mud flow which acted as a dam to hot ascending mineralizing solutions. The best ore in the most productive mine in the district, the Dewey, was in a steeply-dipping zone that cuts intensely altered and sheared volcanic ash and impure sandstone beds. The ore grades into mineralized rock too lean to mine and the boundary between them has been determined by assays. Milling ore has been found to a depth of about 114 feet, although the effects of mineralization have been proved to extend to a depth of 250 feet. The mineralized rock extends over a zone in places more than 200 feet wide, but much of the mineralized material has been of too low-grade to mine. Landslides are widespread in the Thunder Mountain area and some are still moving. The landslides have had an important effect on the extent of the ore bodies in this district and, in prospecting, due consideration should be given to them.

The placer deposits of central Idaho have yielded more gold than the lodes. The auriferous sediments, parts of which form the placer deposits, are the result of a complicated sequence of events that took place after the accumulation of the lava flows and related rocks, such as those found near Thunder Mountain.

Ancient streams in the relatively rugged terrain that was then central Idaho slowly but persistently reduced the land to a plainlike erosion surface not far above base-level. The reduction was not complete, however, and numbers of hills projected above the low-lying plain. As the hills were reduced and the valleys widened the streams could no longer carry
the burden of gravel, sand, and silt brought to them, and hence dropped much of their load along the broad valley floors on which they flowed.

After the formation of this partly sediment-covered plain the whole region was uplifted to its present altitude. Basinlike depressions were formed by differential uplift and where the basins were closed they were filled with water and became inland lakes. Into the basins came the gravel, sand, and silt eroded from the surrounding divides.

Before the basins were entirely filled, active new streams developed on the tilted and elevated old surface. These streams rapidly cut the deep canyons so prevalent in central Idaho, and the down-cutting and headward advance of the canyons are still in progress. The young streams have tapped most of the enclosed basins, have removed large quantities of sediments that formerly occupied them, and have reworked and redeposited other large quantities at lower altitudes in the basins.

Many patches of the sediments, deposited on the erosion surface when it lay near base level, still remain on it in its present elevated position. These sediments are not generally rich enough to be mined for gold. Locally, as on War Eagle Mountain, such old channels have been successfully mined. Similarly, the older basin-fill is ordinarily not very rich, although it has been worked locally. The reworking of the basin-fill by relatively young streams that have tapped the basins has resulted in a reconcentration of the gold in the sediments. These reconcentrated deposits have yielded rich returns to placer operators.

The exact amount of the gold that has come from central Idaho since the discovery of the first camp will never be known. Old records are incomplete, there is no record of millions taken out by Chinese miners nor of the dust that found its way to California and was credited to that State. As nearly as the Geological Survey can estimate, the total probably is in excess of $250,000,000. Of this, probably more than $100,000,000 has come from lodes.

The first gold camp in Idaho was Pierce. It was founded by Captain E. D. Pierce in 1860. From Pierce wave after wave of prospectors pushed south and east to new "diggings" at Elk City, Florence, Newsome, Dixie, and Warren. Prospectors from eastern Oregon discovered the rich ground in the Boise Basin and a group from Montana started mining at Leesburg.

The boom activity of the discovery days was relatively short-lived, for by 1875 the readily accessible bonanza ground was largely exhausted and central Idaho entered on a period of quiescence from which until the middle '80's, it was roused only occasionally by a new discovery.

In the '80's a marked revival took place, and in the late '90's and first few years of this century great excitement resulted in rushes to Buffalo Hump and Thunder Mountain. Most of the mines were again inactive before 1910.

Better transportation facilities in central Idaho and the recent depression have caused a revival in placer and lode mining that began about 1930. The revival was given further impetus since 1933 by the increase in the price of gold. Old mines have been reopened and new ones started at Golden, Thunder Mountain, Elk City, Dixie, Orogrande, Warren, Marshall Lake, Edwardsburg, and elsewhere. Dredges and other equipment for handling large volumes of relatively low-grade placer ground have been put into operation in several localities.

In 1930 Idaho produced less than $450,000 worth of gold. Figures recently released by the United States Bureau of Mines report the recovery of gold worth $2,800,000 during 1936.

The improved transportation facilities in central Idaho are worthy of emphasis. Before 1930 few roads existed and some of these were barely passable. Since then the Forest Service, the C. C. C., and the United States Bureau of Public Roads have constructed many miles of roads and telephone lines, and have cleared and smoothed a number of mountain meadows to form airplane fields. Thus large parts of central Idaho are now readily accessible.
Notable examples of new trunk roads are those along the South Fork of the Clearwater, completed in 1932, and along the Salmon River from Riggins to Shoup now under construction and partly completed. Ever expanding networks from such strategic roads are constantly rendering accessible formerly isolated areas.

Practically all types of gold deposits have responded to the recent impetus to gold mining, some of the reasons for which have been mentioned above.

In general the gold-quartz veins are numerous but not large. Mineralogically, they are simple and similar and, where several are close by, consideration might be given to the possibility of treating their ore in a centrally located mill.

Some of the large shear-zone deposits are now being mined. Thorough sampling possibly will prove parts of others to be of minable grade.

Deposits in the lavas and related rocks cannot be readily distinguished from the altered rocks in which they lie. Hence the possibility of overlooking valuable ore bodies is considerably greater than where the gold is more generally associated with quartz. Careful search, especially where clay minerals are abundant, may reveal valuable deposits in areas occupied by these rocks. Such deposits are likely to have wide lateral extent but relatively little vertical continuity.

Some of the gravel-floored basins of central Idaho, so far as is known, have not been tested for placer gold. Dredging in such typical ones as Boise Basin and Warren recently has been successful. Possibly by large-scale mining, under favorable circumstances, others can be made to yield a profit.

Thus central Idaho looks forward to a new era of development, less spectacular perhaps than that of the discovery days, but probably more lasting.

UNDERGROUND HAULAGE
PHOSPHATE

Phosphate Industry for Idaho

J. D. WOOD, Idaho State Planning Consultant
H. P. TAYLOR, Director of Research

It is my purpose to try to present to you the reasons why the Idaho State Planning Board has ordered a study to be made as to how to commercialize the immense phosphate deposits in southeastern Idaho.

I am a mining engineer so the geological occurrence of these beds appeals to me as a first consideration. However, most of us are concerned only with the fact that they are there in immense quantities and as to what we can do with them.

The United States Geological Survey has determined that there is approximately 6,000,000,000 tons of high grade phosphate rock in these deposits, which means that Idaho has from 75 to 80 per cent of the known deposits in the United States and something over 50 per cent of the known world reserve.

All this does not mean a thing to you or to me unless we can capitalize on it, in direct return in money, employment, happiness and the betterment of human affairs.

This brings us to the consideration of their economic value to this region, to this state and to the nation. This in turn directs us to a consideration of the elements which are the commanding factors in bringing about a greater utilization of Idaho's phosphate rock in the fertilizer industry and on the farms.

We might say that there are two industries, sub-industries, tied up in this consideration:
1. The production and processing of the rock to make it chemically available for use as a phosphate fertilizer.
2. The question of marketing the product at a profit.

Both of these sub-industries have many problems involved in their economic realization.

What is the reason for phosphate in the economy of things? Why be concerned with it? Is it something that is useful today and may not be useful tomorrow? Is it something that can be used or not at the caprice of agriculture? Is there a substitute for it?

Let's give attention to the first question just stated, what is the reason for phosphate in the economy of things?

It is common knowledge that it is a vital and essential constituent of the bones, brain, blood, and tissue of man and animals. The ash analysis of various parts and products of the body in phosphoric acid is as follows:

<table>
<thead>
<tr>
<th>Part</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone</td>
<td>53.31%</td>
</tr>
<tr>
<td>Liver</td>
<td>50.18%</td>
</tr>
<tr>
<td>Lungs</td>
<td>48.5%</td>
</tr>
<tr>
<td>Brain</td>
<td>48.17%</td>
</tr>
<tr>
<td>Calf muscles</td>
<td>48.13%</td>
</tr>
<tr>
<td>Excrements</td>
<td>36.03%</td>
</tr>
<tr>
<td>Milk</td>
<td>19%</td>
</tr>
<tr>
<td>Urine</td>
<td>11.21%</td>
</tr>
<tr>
<td>Bile</td>
<td>10.45%</td>
</tr>
<tr>
<td>Blood</td>
<td>10.23%</td>
</tr>
</tbody>
</table>

I don't believe that anyone is going to question the vital need of phosphate to human and animal life.

The next question: WHY BE CONCERNED WITH IT?

It is up to you and me to be concerned with it because you and I are called on to see that we get this vital element in our food supply, otherwise, we will be wiped out. It is our food supply then which must carry this element into our systems and it must come from the things the land produces for our consumption. Fortunately this element is as necessary to
plant life as it is to human and animal life. Hence, we get our supply through these provisions.

Phosphate stimulates rapid growth and early maturity and ripening of crops. It increases the proportion of grain growth to stock in cereal crops, directly opposite to nitrogen activity which promotes stock growth and delays maturity. In many instances it aids in the assimilation of other plant foods present in the soil and beneficially influences soil bacteria growth and nullifies injurious effects of toxic organic substances in soils.

IS IT SOMETHING THAT IS USEFUL TODAY AND MAY NOT BE USEFUL TOMORROW? This question is negatively answered in the statements that have gone before and can further be answered in this way: that the usefulness of man-prepared-phosphate is increasing tremendously as time marches on and that it will continue to increase in a geometric ratio as the ravages of waste and the deterioration of living organisms show its deficiency. The increased and prolonged use of phosphate is as sure as anything material can be.

Is it something that can be used or not at the caprice of agriculture? This has been the decision of agriculture in general in the past, but the time has come when agriculture no longer has the choice. It must fertilize with phosphate in order to produce, not only because this element is necessary to all life, but also because land will not produce an American standard of living unless it is used. The evidence is all about us that there is something wrong with agriculture and it is fast being determined that agricultural procedure needs revision in actual land utilization and treatment.

Is there a substitute for it? NO. Has anyone yet found that a life element can be eliminated or substituted? From the plant growth standpoint does anyone here think that an element that enters into the alfalfa make-up can be eliminated or substituted? You and I know it can't be done and the sooner we accommodate our practice to the inexorable requirements of nature, the sooner we will lift ourselves into the profit bracket in our agricultural activities. Stubborn determination on the part of man to defy the needs of his acres will never put such a one on the lists of the successful. The time is fast arriving when the mistreated and robbed acres will no longer respond to labor alone and it will be realized that a 40-acre tract is a manufacturing plant in which the raw materials, fertilizer, water, sunshine and labor must be supplied before the processed products, such as grain, hay, livestock, dairy products can be produced. Labor and dogged determination are no longer substitutes for the application of phosphates to the soil.

The problem that confronts Idaho is, how can her immense phosphate beds be turned into industry and be made to furnish her part in up-building the fertility of soils and in meeting the needs of labor and society.

Why can't the beds of Idaho be industrialized on a larger scale than at present to advance the social-economic status of Idaho and her people as well as making the phosphate of Idaho available in the big job ahead of agriculture in rebuilding the soil fertility of this nation?

I, for one, am convinced that the soil has been so robbed of its fertility in our mad scramble to make ends meet on the farm that the profit increment has all but been eliminated on a major portion of our crop lands. The drop in production on our very best acres shows what has taken place. We have hauled off, walked off, and poured off of our acres the vital element, phosphate, which can only be returned by replacing it with man-prepared, chemically-available, phosphate.

For many decades, perhaps a hundred years, up to 1931, the agricultural fraternity accepted the findings of Lawes and Gilbert relative to the make-up of phosphate rock as tricalcium phosphate. Liebig, of Germany, had already announced the theory of plant nutrition; that nitrogen—phosphoric acid—potash, were the principal elements needed for plant growth. Potash and nitrogen, available for plant food, were to be had but phosphorus, the element needed in greater quantity, was available in a raw material, phosphate.
rock, but was in such form as to be insoluble in water and unavailable to plant life except in a very limited degree. Lawes and Gilbert discovered that by digesting the finely divided rock with approximately an equal weight of sulphuric acid that solubility was greatly increased and proved it in actual work with field crops. We have found ways of increasing the concentration of phosphoric acid to triple superphosphate—about 45% of phosphoric acid, the active plant food.

What I am about to relate may mean that Idaho phosphates can enter the marts of trade with a fair show of holding their own and the Idaho phosphate industry becoming an entity in the picture. In 1931 S. B. Hendricks, of the Fixed Nitrogen Laboratory in Washington, made the discovery through the use of modern scientific methods, the X-ray defraction method, that a substance actually known as tricalcium phosphate did not give the same results as the so-called same phosphate rock, which led to the discovery that phosphate rock is not a tricalcium phosphate but is a calcium fluorophosphate. This discovery led to questioning among scientific investigators and to the question, what would happen if in some way the fluorine element could be eliminated. The fertilizer laboratory of the United States Department of Agriculture tackled the problem of other than the sulphuric acid treatment for phosphate rock under the leadership of division chief, C. H. Kunsman. These workers discovered that the fluorine element in the rock was the one holding the phosphorus out of solution, thus preventing it from being readily available to plants.

They went to work to determine means for driving this fluorine out of the rock and took advantage of the known affinity of fluorine for silica which is an impurity in all phosphate rock. At 1400 degrees centigrade, about 2500 degrees Fahrenheit, the fluorine unites with the silica in the presence of steam (water vapor) and evaporates.

Let me tell you how close these investigators came to failure, or might have come to failure, had they been less persistent. When they reached the point where 60% of the fluorine was driven off the phosphorus was found far less available than when they began but they would not take NO for an answer. Beyond the 60% point solubility began to increase very rapidly and at 95% the solubility was practically 100%.

Plant response is the same, unit for unit, as for the super-phosphate.

A statement by Kunsman is very interesting. “The process involves heating phosphate rock (containing about 4 per cent or more of total silica) in the presence of water vapor at 1400 degrees Centigrade. The rocks should be crushed to pass a 10-mesh or a 20-mesh sieve and the heating should be done in such a manner as to obtain the maximum degree of contact between the water vapor and the phosphate particles. The product is obtained in the form of a sintered or semi-fused clinker which needs only to be ground to the desired fineness for fertilizer purposes.

“Although we have confined our investigation entirely to experiments in small laboratory furnaces, we know that the process can be operated in rotary kilns of the type used in the manufacture of Portland cement. In this type of furnace the water vapor necessary for the reaction is supplied by the combustion of fuel (fuel oil). The process is now being investigated on a pilot-plant scale by several companies in this country and we anticipate that commercial operation will be realized at an early date.”

The manufacturing problem promises to be simple. It will, in all probability be carried on just as we manufacture cement, in the rotary kiln type of roaster, and known as the calcining process, with perhaps less crushing at both ends of the operation. The product carries double strength phosphorus over the superphosphate, thus reducing the costs of production. Perhaps, concentration can be worked out with this new product which will still further reduce its cost. It is a new product and its possibilities are perhaps not yet visioned and will come when we have more of the product to work with.

Idaho's beds are most advantageously located, since they are close in to coal fields and even to gas and oil in Wyoming.
The TVA in Tennessee, as you no doubt know, has a large federal allot­
ment, $3,000,000 with which to experiment on making phosphate fertilizer
with the electric furnace. Idaho has an abundance of power within range
of these beds and so TVA is working on our problem. I believe the Idaho
State Planning Board will ask for TVA help for experimenting with the
calcining process here in Idaho though it may not be necessary for, as Mr.
Kunsman has written, several operations are now in process of experimenta-
tion on a commercial scale.

Another far reaching and important discovery was announced at the
Chemurgic Conference in Fresno, California, the last of March. Professor
V. E. Spencer, Nevada Experiment Station, is the man responsible for this
discovery and in his words, “Apparently because Liebig's method of ‘grinding’
renders the phosphate soluble in water, ever since his time it has been
generally assumed that the phosphate accompanies the water downward,
and is thus well dispersed in the soil. This fallacy seems to have taken root
and persisted even in the face of the known fact of phosphate fixation.

What are the facts regarding this important question of phosphate
penetration through soils? Here are some of them. After fifty years of
applying approximately 400 pounds of superphosphate per acre per year, on
Broadbalk field at Rothamsted, England, it was found that practically none
of the phosphorus had gone deeper than nine inches. Likewise, in West
Virginia, Wisconsin, Illinois, California, Ohio, Hawaii, and at other places,
similar conditions have been found. That is, there is no appreciable penetra-
tion of phosphate below the plowed depth of soil.

“We may represent the phosphate as tricalcium phosphate, which is
insoluble in water. The acid dissolves it and changes it to monocalcium
phosphate, which is the chief constituent of superphosphate. This monocal-
cium phosphate is soluble in water. As long as it is not in contact with the
soil, or with anything that will precipitate it, it remains soluble. But when
it encounters compounds of calcium, or iron, or aluminum, etc., under the
usual conditions existing in the soil, it is changed back to an insoluble form.

“Thus, the soil acts as a ‘chemical sieve,' and although the water passes
down into the soil, the phosphate stays behind, near the surface, because
it is now insoluble. That is the reason many investigators have found this
lack of appreciable penetration below the plowed depth. It is also the reason
why drainage waters usually contain only a mere trace of phosphate.

“Let us now turn to the question of root systems of plants. It is well
known that the root habits of plants vary a good deal depending on the
nature of the soil, moisture conditions, etc. Probably there are instances
where phosphate penetration downward has been extensive enough to be of
some benefit even to orchard trees. However, it is extremely probable that
such instances are rather rare exceptions.

“Up to this point, I have tried to bring out two main facts: First, that
the phosphate does not penetrate essentially below the plowed depth; and
second that the roots forage much deeper than this surface layer of soil.

“Here the question naturally comes up: Is it desirable to have the phos-
phorus penetrate this deeper layer of soil below the plowed depth? Many
investigators have expressed themselves on this question, and in the affirm-
ative. However, the question has not been answered, that is, it has not been
decided by experimental results that are sufficiently definite and extensive.

“Inspired by our desire to learn the answer to this basic question of
differential feeding within a single root system, we completed an experiment.

“We were aware that several investigations had been made in attempts
to learn the specific nature of the compound containing the fixed phosphate.
From the standpoint of chemical availability, knowledge of such compounds
is undoubtedly essential. But in our consideration we passed over that point
as non-essential for the present, because the fact of primary importance is
simply that whatever they are, they are all insoluble. Thus it was funda-
mentally a question of finding a means of conferring a more persistent
water solubility on the applied phosphate. It was necessary to do something
which would permit the phosphate to remain soluble in water after it reacted with the soil.

"We therefore sought a proper solubilizing agent. We found it readily, through consideration of an analogous case well known in organic chemistry. One compound is butane, one of the saturated hydrocarbons occurring in petroleum. It is insoluble in water. However, if a hydroxyl group (OH) is substituted in place of one of the hydrogens, then we have butyl alcohol which is appreciably soluble in water, about 8 parts in 100.

"Here then, was a fact of organic chemistry which we could use in our phosphate problem. We reasoned that we could combine the phosphate with an organic compound containing one or more of these hydroxyls; and that such an organic phosphate, even the calcium salt, or other insoluble salts, should then be soluble as a result of this combination.

"Now let us examine the two formulas. The one is calcium hydrogen phosphate or what is commonly called di-calcium phosphate. It is insoluble in water. The other formula shows this same compound, but now combined with glucose. Note that glucose has been substituted for the hydrogen of the di-calcium phosphate. This glucose phosphate is very soluble in water, even though the calcium is still in the molecule.

"This shows one method of conferring solubility on an insoluble phosphate. I must point out, here, that this method is different than the method used by Liebig (which was through dissolving in acid); and that this 'organic' method results in a solubility of a different kind, if I may put it that way. This is demonstrated by the different behavior of the organics as compared with the inorganics, when they come in contact with the soil. Our theory was that the organo-phosphate would remain soluble in the soil; at least long enough to penetrate the deeper soil layer.

"On trying it out, we found this to be the case; and it is a very different behavior from that of the inorganic phosphates. They revert to an insoluble form, presumably through contact with metallic cations in the soil, such as calcium, iron, and aluminum, which precipitate them. But as you see, the organo-phosphate is soluble even in combination with such a cation; therefore it makes no difference whether or not this phosphate reacts with these ions in the soil; it stays soluble anyway.

"Up to the present we have tried five different organo-phosphates of this type. We found that they all possess water solubility even in contact with the soil.

"The indications are, therefore, that by means of some of these organic phosphates we can apply phosphorus at least to a depth of three or four feet, and probably deeper. This has not yet been tried in fields and orchards, because we have not had sufficient amounts of the organo-phosphates.

"To produce the organo-phosphates naturally requires organic compounds, and these must come from the farm. Of the various organic phosphates, the glucose phosphate seems at present to be the most promising, from the standpoints of chemical availability, of ability to permeate the soil, and of cost. Production of this organic phosphate, on the scale which would be demanded in the case of a fertilizer, would require very large amounts of the crops which supply starch, such as corn and potatoes. Cheap molasses is also a possible raw material.

"I must state frankly that the relative field efficiency of the organic phosphates, as compared with the inorganic phosphates now used, is not known."

I quote from a letter of Mr. Spencer to our office in answer to one from us, "In order to confer the necessary solubility on the insoluble phosphate we resorted to a combination of the phosphate with a certain type of organic radical. Glucose, and several other organic compounds, are capable of giving phosphate the required solubility. That is why our development is of such vital interest. If such organo-phosphate should be produced on a fertilizer scale, farm crops from which starch or sugar can be produced would be required in tremendous quantities."
"Referring to the questions you raise in the third paragraph of your letter, in the order they appear there: The value of the organo-phosphate as a plant food is very high; in fact, in practically all our experiments we have found it to be superior, in this respect alone, to the inorganic phosphates.

"As for the third point, I believe you are safe in assuming that this form of phosphate is here to stay. This is not just another form of phosphate, in the sense of an attempt to produce something with greater chemical availability. As I have indicated above, it does appear to have that advantage, but I am frank to tell you that we did not even aim in that direction at first. What we were concerned with was the amazing lack of positional availability of the phosphates at present used; a lack which has gone practically unnoticed for the last hundred years. We did something revolutionary about that, as you can see from the enclosed reprint.

"In your last paragraph you indicate that you would appreciate any surmising I might wish to do. For one thing, I surmise that agriculture in general will be greatly benefited by success in putting deeper fertility into our soils. And further, that this will be accomplished most easily and economically through the use of this type of organo-phosphate. In fact, this method is the only one, aside from moving and stirring the whole mass of soil, by which this may be done."

What I have just quoted means much to Idaho where we have been irrigating with hard water that gradually destroys the life of our farms. It means that there is a phosphate which may remain soluble in our soil so that our crops can get the benefit of it. Organo-phosphate promises much for Idaho's agriculture in actual farming and in use for farm products in industry as well as increasing the use of phosphate because of its positional availability when put into the ground.

To sum up the situation: Idaho has more high grade phosphate rock than the total quantity in the rest of the world. It is not being used in quantities such as we are justified in believing it should be. Phosphate is an absolute essential to all life and must be supplied for vegetable, animal and man. The demand for phosphate is constantly on the increase and will increase tremendously in the near future. There is no choice relative to the use or non-use of phosphate. The time has arrived when it must be used in quantity if mankind is to be properly fed, if animals are to grow and mature, and crops raised at a profit. There is no substitute for it, the soil, in nearly all cases is not producing abundantly because of lack of it and agriculture with its dependents have reached the parting of the ways; either they fertilize with phosphates, and in some instances with other elements, or the land will soon be in other ownership. Phosphate is not a panacea. It will not cure all cases of agricultural belly ache, but it will remedy most of them. In the case of phosphate as in nearly all other, you might say all other, things necessary to human activity, it must be handled with judgment and with knowledge of conditions and how to operate. Blind guessing won't do. The time for thinkers has come. Most of the soils of this nation and in Idaho are sick and your acres need your good judgment more than they need your labor.

I have recited in some detail the two recent discoveries relative to phosphate and its uses. These two discoveries may have a profound influence on Idaho phosphate beds as regards their commercialization. I have hinted some of the activities that are at work to bring about this desired position. Freight rates and costs of production and processing are all factors in our problem and I can say that the State Planning Board, in its investigation, is giving its attention to all these things and many other considerations and that we are being encouraged to believe that Idaho will see, in the not distant future, her phosphate deposits yielding new wealth to the state, region and nation.
The Part Phosphates Play in Animal Husbandry

By E. J. IDDINGS, Dean and Director
College of Agriculture, Agricultural Experiment Station
MOSCOW, IDAHO

Before entering into the technical phase of this discussion, I should like to clarify two points that will be helpful in a mutual understanding of my statements. The animal husbandry division of the University of Idaho deals with beef cattle, sheep, swine, and horses, and the following discussion will apply to only these types of livestock. Furthermore, from an animal point of view, we shall have to talk about phosphorus and its importance to livestock rather than phosphates. A phosphate is a compound containing phosphorus and is a term more generally used in the field of soils and crops. Since there are many phosphate compounds and only one phosphorus element, phosphorus lends itself much better to a more definite and clear-cut discussion.

Importance of phosphorus to the animal body: One of the largest functions of phosphorus is its association with calcium plus the aid of vitamin D to form the bony structure of the body. An improper balance of phosphorus to calcium or a lack of phosphorus in the diet of an animal will result in a condition known as osteoporosis in mature animals and rickets in young animals. Other important functions of phosphorus is the production and maintenance of teeth, formation of blood constituents (phospholipids and inorganic phosphates), maintaining the acid-base of equilibrium, repairing body cells, aiding in muscle contraction, production of young, and for milk production.

The functions of phosphorus to the animal industry as a whole are very important, and the life processes of growth maintenance and reproduction are dependent on this element in the diet.

The lack of phosphorous in the ration of a farm animal is manifested by a loss of appetite, chewing of foreign materials, such as bones, leather, wood and dirt, roughening of the hair coat, a decrease in milk production, low blood phosphorus, loss in weight, and in general, the reproductive and life processes are retarded.

Livestock most likely to suffer from a deficiency in phosphorus on the farm are growing, lactating, and pregnant animals. The development of the foetus in the animal body demands a large supply of phosphorus which must be obtained through the blood stream of the mother. Growing stock have a high requirement due to the rapid growth of the bony tissues as well as other body tissues. Milk is high in phosphorus and thus animals suckling young need an abundant supply in their feed in order to maintain their milk flow.

Sources of phosphorus for livestock: Broadly speaking, all cereal grains and by-products of cereal grains contain sufficient amount of phosphorus for livestock, when properly used. Legume roughages, such as alfalfa and soybean hay, are considered as high phosphorus feeds, and when these hays are fed in the proper amounts, usually the phosphorus requirements are met. One exception that might apply to plants in general is that the per cent of phosphorus contained in feeds is affected materially by the abundance of available phosphorus in the soil. Hays grown on soil sadly deficient in P, usually result in a feed deficient in P.

All protein supplements are classed as high phosphorus feeds, excepting blood meal. When a ration is adequately supplemented with cottonseed meal, linseed meal, soybean meal, tankage, fish meal, skim milk, buttermilk, wheat bran, corn gluten feed, flaxseed, field peas, peanut oil meal, wheat middlings, or field beans, the animal will, in most cases, be sufficiently supplied with phosphorus.
Pasture, excepting where the soil is definitely deficient in available phosphorus, is an excellent source of phosphorus. There are certain restricted areas in Minnesota, Wisconsin, Texas, Arizona, and a few other states where a phosphorus deficiency has been noted among the livestock on both the range and the farm. In such areas feeding of mineral supplements has proved profitable.

The mineral supplement used most commonly to correct deficiencies of phosphorus is steamed bone meal. Other sources are spent bone black, raw bone meal, dicalcium phosphate, and phosphates from rock origin from which practically all the fluorine has been removed. A majority of these mineral supplements are used by the dairy and swine industries.

**Rock phosphate as a livestock feed:** A large sum of money has been spent by commercial interests in the East and Mid-west as grants to Experiment Stations to find out the true worth of rock phosphate to animal industry. Recent investigations at Michigan (1) and Wisconsin (2) have definitely shown that the fluorine in the rock phosphate used in their experiments was detrimental to the proper metabolism of the bone and teeth. Fluorine is a violent poison when consumed in considerable amounts and has a cumulative poisonous effect when consumed in only small amounts over a long period.

Wisconsin (2) workers have shown that where only 0.6 lb. of rock phosphate was included in each 100 lbs. of a dairy mixture that the teeth became soft, that the cattle were unable to chew their food properly. Concordant results were obtained by Michigan experimenters when feeding 1.5% rock phosphate, the only difference being that these animals showed the symptoms much quicker. In the above experiments milk production was seriously reduced, and reproduction was impaired.

Injury resulted to swine, as shown by Wisconsin workers (2), when the rations contained from .8 to 1.6% rock phosphate. The pigs produced from sows on these rations were not normal. Growth and reproduction was retarded.

Many other experiment station workers have obtained the same results. (3, 4, 5.)

**Need of phosphorus supplements for beef cattle, sheep, swine, and horses in Idaho:** Idaho is extremely fortunate in having an abundance of good phosphorus feeds in alfalfa hay, barley, wheat, and peas, and good natural range in most sections. On the other hand, the improper use of our beet pulp supply in feeding livestock may result in a need for commercial sources of phosphorus. Beet pulp is a very low phosphorus feed. However, if a beet pulp ration is properly supplemented with protein according to accepted feeding standards, the phosphorus requirements will be satisfied.

Feeding experiments at Caldwell and Aberdeen experiment stations (see Annual Reports, 1934-35) with lambs and steers have indicated that the addition of phosphorus to typical Idaho feed lot rations in the form of bonemeal or monocalcium phosphate had no beneficial effects. In some cases the addition of these supplements even showed a depressing effect on the gains.

We have not conducted any mineral experiments with swine, but due to the abundance of small grains, the Idaho system of swine feeding has not indicated any deficiency in phosphorus. The element that is usually lacking in swine rations is calcium.

Horses seldom show any signs of a mineral deficiency even under adverse conditions. Horses are slow maturing animals; they consume large amounts of roughages; are usually on pasture part of the year; are fed grain during the working season; and as a result, there have been no reports either in Idaho or the other states of a deficiency in phosphorus in horses.

Considering this matter strictly from a livestock point of view, it appears at present that Idaho (excepting maybe for a few restricted areas) is supplied with plenty of native feeds on both the farms and ranges that
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are sufficiently abundant in phosphorus, if properly used, to supply enough phosphorus for the normal growth, fattening, and reproductive processes of beef cattle, sheep, swine, and horses.

I am citing the following references to support the statements made in this report. The original articles may be secured from the respective places of publication.


Recent Developments in the Phosphate Industry

By E. M. NORRIS

Superintendent, Anaconda Copper Mining Co., Fertilizer Department, Conda, Idaho

One of the great phosphate deposits of the world is centered in southeastern Idaho, and extends north into Montana and Canada, south into Utah, and eastward into Wyoming.

The more important phosphate occurrences of this area are in phosphoria formation of Permian Age in the upper carboniferous series. It is believed that all of these occurrences originated under a single set of geological conditions within a single marine unit, and approximately simultaneous with respect to time. Thus, in southwestern Montana, eastern Idaho, western Wyoming, and northeastern Utah, the original distribution of the phosphoria beds persisted throughout an area of perhaps more than 75,000 square miles. Within the phosphoria formation, two horizons exhibit a tendency toward richer concentration of tri-calcium phosphate. These occur near the upper and lower limits of the series, and of these, the upper member, which is by far the more extensive, is well represented throughout an area exceeding 25,000 square miles.

This principal bed, as observed in the more valuable fields of southwestern Montana, eastern Idaho, western Wyoming, and northeastern Utah, is a dark to gray finely oolitic layer, four to seven feet thick, containing more than 70 per cent of tri-calcium phosphate. In general, the beds thin laterally to the east, north and west from a center which is in the proximity of the Idaho-Wyoming-Utah boundary intersection. Thinning is generally accompanied by deterioration in phosphate content, with the one exception of a distinct improvement northerly into Montana fields.

The estimates of tonnage of this western phosphate deposit produce figures of astronomical proportions, Idaho's share is set at nearly five billion long tons, while her neighbors, Montana, Utah, and Wyoming, are estimated to possess an additional eight hundred million tons between them.

It is a natural question for the layman to ask, "Why, if we have such tremendous natural resources in our back yard, don't we do something about it?" An answer is supplied by the report of the United States Tariff Commission to the Congress, on June 3rd, 1935, which says, in part: "The immense deposits in the west are of interest as a potential source of supply. At present they supply a very small part of domestic consumption, because
of their distance from principal markets, and because they are more costly to mine than phosphate occurring in Florida and Tennessee."

The world production of phosphate rock declined, from an all-time high of about twelve million metric tons in 1930, to a low of 6.8 million tons in 1932. In 1934, the production has increased to about 8.9 million metric tons, of which French possessions and protectorates produced 41.3 per cent, the United States 32.4 per cent, British possessions and zones of influence 12.7 per cent, and the Soviet Union of Russia 12.8 per cent.

The outstanding feature of the 1934 statistics is Russia's production of 1.136,198 metric tons, which is an increase of 1,400 per cent above her production in 1929, which amounted to 81,000 tons. The Soviet Union, since 1929, through its "Apatite Trust," has been actively developing its vast apatite deposits in the Khibinsk Mountains, located on the Kola Peninsula on the White Sea. This deposit is estimated to contain more than five million tons of phosphate material; the upper stratum, 20 to 50 meters in thickness, is said to average better than 67 per cent tri-calcium phosphate; the lower grade material is concentrated by flotation to a grade of approximately 74 per cent tri-calcium phosphate. This development is an extensive one and embraces a large hydro-electric plant, railroad branches to the deposits, and plans for the settlement of twelve to fourteen thousand people to work these deposits. In 1932, the "Apatite Trust" delivered sixty-five hundred tons of Khibinsk apatite concentrates at Baltimore, at a price of $3.60 per ton. This price was about 30 per cent under the current American market for a similar grade of material. Further importations of this material have been prevented by the action of the United States Tariff Commission, which found unfairness under the tariff act of 1930. As a result of the Khibinsk development, increasing pressure upon the world's crude phosphate markets is to be anticipated.

Another extensive phosphate deposit has been intensively developed since 1928 by a French company, Office Cherifien des Phosphates, at Louis Gentile in Morocco. This deposit is said to contain several billion tons of phosphoric sand, averaging about 69 per cent tri-calcium phosphate. A wharf and piers have been built at the port of Saffi, and a railroad eighty kilometers in length has been constructed to the mines, where machinery has been installed with a capacity to produce about one million tons a year. Conditions are said to be favorable for very low cost production. Imports of crude phosphate rock from Morocco into the United States increased sharply in 1928 and 1929, but have since fallen off, due to the anti-dumping proceedings of American producers.

The report of the Tariff Commission, above referred to, says of the competitive conditions: "Phosphate rock from French North Africa has replaced considerable American rock in European markets. Apatite from the Soviet Union has also begun to do the same thing. Recently, however, the decline of the dollar, in terms of gold, has been an aid to American exporters competing with the French exporters. Largely as a result of this dollar devaluation, a sales agreement between American and French exporters has been effected. The terms of the agreement are not known, but it is reported that American exporters are to have a certain percentage of the European market. The Soviet Union is not a party to the agreement."

Turning to the domestic situation, we find a United States production in 1934 of 2.9 million long tons of crude phosphate rock, of which Florida produced 85 per cent, Tennessee and Virginia 14 per cent, Idaho and Montana less than one per cent.

The United States Bureau of Mines estimates that the domestic production of phosphate rock goes into consumption, by principal uses, as follows: For the manufacture of superphosphate, 57 per cent; exported, 32 per cent; used in chemical manufacture, 9.5 per cent; for direct application to the soil as a fertilizer, 0.3 per cent; for fertilizer filler, stock feed, and miscellaneous uses, 1.2 per cent.

The Florida producers have a monopoly on the export business, because of their short haul to tidewater; the average Florida freight rate from mines
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to tidewater was stated, at a railroad rate hearing held in 1933, to be 78 cents per ton. The western freight rate of $4.40 from mines to Pacific shipping ports, constitutes a formidable obstacle to western export trade.

During the past four years a number of flotation plants have been installed in the Florida Land Pebble Phosphate district. They are reported to have doubled the recovery of phosphate, at a cost of about one dollar per ton for the additional phosphate recovered from the tailings. This development promises to strengthen the competitive position of the Florida producers and to greatly increase the life of the Florida deposits, now estimated at about one hundred years, at the present rate of production.

The installation of the TVA experimental plant at Wilson Dam has caused great activity in the Tennessee phosphate fields, and production of rock from this source increased 28 per cent in 1934, as compared with 1933. The experimental plant has installed both blast and electric furnaces for recovery of phosphoric acid from the crude rock. The production of triple superphosphate fertilizer was begun last February; the present production is said to be about one hundred tons per day. No cost figures have been given out, except rock costs, which are comparable to western costs on a \( P_2O_5 \) unit basis, delivered at the manufacturing plant. The Tennessee rock for TVA has been supplied on a royalty and contract arrangement, on which the miners make from 50 to 60 cents per day. It does not seem probable that, the government can continue to obtain phosphate rock on such a low wage basis. The superphosphate produced has been given away to local farmers in furtherance of the campaign to check soil erosion in the Tennessee valley.

The TVA experiments will probably stimulate furnace production of phosphoric acid in the Tennessee field. One new plant is already under construction. The Tennessee phosphate deposits are estimated to contain ninety-three million tons, and as they are close to the distribution centers of the fertilizer industry, the stimulus recently imparted by TVA will probably have a far-reaching effect upon the domestic trade.

The western phosphate developments pale into insignificance after Khibinsk and Louis Gentil, nevertheless, some positive achievements have been made. The Anaconda Copper Mining Company has just completed the first stages of an extensive development program at its Conda, Idaho, property. A three-compartment concrete shaft raise, 540 feet high, links the phosphate beds, extending sixteen miles along the east flank of the Aspen anticline, with the milling and mining plants at Conda, through an eight thousand-foot crosscut tunnel. This development makes available a large tonnage of phosphate rock, of 70 per cent grade, for shipment from the railhead at Conda.

The Conda plant, completed in 1921, has since maintained an average annual production of 39,000 short tons. Its present capacity is 150,000 tons. About 92 per cent of its shipments go to Anaconda's phosphate plant at Anaconda, Montana, for manufacture into phosphoric acid, triple superphosphate, and ammonium phosphate; these products, although concentrated, are limited to a market radius of less than one thousand miles from the plant at Anaconda. This limitation of market is due to competition from Tennessee producers on the east and Japanese competition on the Pacific coast. This western market, although embracing a wide territory, is thinly populated and consumes but two per cent of the phosphate used in the United States.

Important western developments in the last few years include the occurrences of high grade phosphate rock in Montana, particularly on Gimlet Creek near Avon. Here the phosphate occurs between hard walls under conditions ideal for low cost mining of clean rock. The bed averaged 79 per cent tri-calcium phosphate, for a width of over three feet. The outcrop length exceeds five miles. The property is situated within forty-eight miles of the manufacturing plant at Anaconda. It is being opened up by the Anaconda Company, and preliminary work shows the available tonnage to be very extensive. Recent tests show that the Anaconda plant can produce
superphosphate from this source at a much lower cost than from the rock mined at Conda, Idaho.

Another important development in Montana is the Anderson Mine in the Brook Creek area near Garrison. It enjoys the same advantage for low cost and clean mining as the Avon area and is even more accessible to present railroad transportation. The Consolidated Mining and Smelting Company of Canada became interested in this area in 1930, and since that time have done considerable exploration and development work. As a result, these interests have abandoned their attempts to open a property near Paris, Idaho, and now secure their phosphate requirements entirely from the Brook Creek area in Montana. The grade of the rock as mined averages at least 70 per cent tri-calcium phosphate and the average thickness of the bed is three feet. Above present tunnel levels, a reserve of 6.5 million tons may be developed.

The Anaconda Company owns phosphate land on Warm Springs Creek between the Anderson Mine and the Gimlet Creek area. Here a camp, easily accessible to the railroad, was set up and some development work has been done. The average grade of the bed is about 68 per cent tri-calcium phosphate for a thickness of 3.5 feet. It dips at a favorable angle for cheap mining. Actual operations were not undertaken in this area, in spite of its favorable location with respect to the plant at Anaconda, because the fluorine content at the point exposed was slightly in excess of the acceptable limits. It now appears that this feature is local in occurrence, as witnessed by the recent high grade developments, both west on Brook Creek and east on Gimlet Creek. Above present tunnel levels a reserve of 2.5 million tons may be set out as available.

These three areas are included along a continuous outcrop approximately sixteen miles in length and referred to as the Garrison Field. As development progresses, it is attracting increased attention as a future source of high grade phosphate rock.

To the east of this field is found the Ellison district, where important new developments have been made by the Northern Pacific Railroad Company. On Trout Creek, near the town of Elliston, tunnel work has exposed a phosphate bed which varies in thickness from four to six feet, and dips at steep angles. Three carload shipments to Trail, B. C., averaged better than 80 per cent tri-calcium phosphate. While this may represent the better portions, there is an outcrop length of seven miles from which grade phosphate may be expected.

During the past three years a small amount of work has been done on the Utah phosphate beds, in Weber Canyon and along the eastern slope of the Wasatch range, south of Salt Lake City. No important tonnage has been blocked out to date.

The active western phosphate producers are equipped to produce about 10 per cent of the present United States consumption of crude phosphate rock. This capacity could probably be quickly trebled if market conditions were favorable. They are limited, however, "because of their distance from principal markets," to about 20 per cent of their present capacity.

Recent developments in the manufacture of commercial phosphate from crude phosphate rock do not offer the western producer any encouragement at the present time. Electric and blast furnace production of phosphoric acid is increasing, although production costs have not been lowered to date by furnace methods, as compared with the older sulphuric acid method, where cheap sulphuric acid is available.

A method of calcining ground phosphate rock at a temperature of 1,400 degrees Centigrade in the presence of water vapor has been developed by K. D. Jacob and associates of the Department of Agriculture, Bureau of Soils. This method volatilizes a high percentage of the fluorine contained in the crude rock and produces a phosphatic material containing 30 per cent or more of "available" (citrate soluble) phosphorus pentoxide.
An investigation of the fertilizer value of the calcined phosphate was made this year, in a series of greenhouse pot tests, carried out by the Alabama, Arkansas, and West Virginia Agricultural Experiment stations in collaboration with the Department of Agriculture, Bureau of Plant Industry. The results of these tests, as published by the Journal of Agriculture Research, indicate that "calcined phosphate * * * were as efficient sources of phosphorus for plant growth, as were equivalent quantities of total phosphorus from either superphosphate or dicalcium phosphate."

In regard to the commercial production of this newly developed fertilizer material, Mr. Jacob is authority for the statement: "As yet, production of calcined phosphate on a commercial scale has not been achieved. Several companies are investigating the process and we believe that the chances are very good for important developments along this line, at an early date."

The calcined phosphate rock appears to have several advantages over acid phosphate as a fertilizer material, among which are a probable lower cost per unit of available phosphate, better mechanical condition, and weakly alkaline reaction.

Some efforts have been made in recent years, by irresponsible persons, to promote the sale of pulverized phosphate rock for direct application to the western soils. In anticipation of this development, several of the western agricultural colleges have carried on experiments since 1928, to determine the fertilizer value of untreated pulverized phosphate rock. These experiments show that this material has little if any fertilizer value on alkaline soils, such as are common in the western states.

Summing up the high lights of the phosphate rock industry, it appears that:

1. The world production of phosphate rock, in the past two years, has increased about 33.5 per cent from the depression levels of 1932; a study of statistics indicates that a further increase of approximately 20 per cent above 1934 production may be anticipated.

2. A large proportion of the increase noted above has been supplied by Russia and the United States, due to increases in domestic consumption and exports by both countries. Russia appears to be in a favored position to make further large increases in her production and exports. French colonial producers have been temporarily at a disadvantage, but a devaluation of the franc would reverse this position, probably at the expense of Florida exporters.

Domestic consumption should continue to increase at the present rate of approximately 10 per cent per year, for several years. Tennessee production has been stimulated by TVA experiments and the increase in electric power production along the Tennessee River and its tributaries may further increase Tennessee's proportion of the domestic market. Recent development of high grade rock in the Garrison and Ellison districts in Montana gives them a considerable advantage over other western fields, especially as the former are closer to the manufacturing plants at Anaconda and Trail, B. C.

* * *

The product of the Anaconda Copper Mining Company's plant at Conda, Idaho, is treated in the following manner:

The mined phosphate rock is crushed to pass ¾-inch opening and dried to 15% moisture; in this condition it is shipped to Anaconda for further treatment.

At Anaconda the rock is calcined to burn off the organic matter and pulverized to pass 80 mesh. It is then treated with sulphuric acid to form dilute phosphoric acid and gypsum; the latter is a waste product.

The phosphoric acid is concentrated by heating and subjecting to a vacuum. An additional quantity of the calcined and pulverized phosphate rock
MINING INDUSTRY OF IDAHO

is treated with the concentrated phosphoric acid to form a water soluble product known to the fertilizer industry as triple superphosphate.

In this process the raw phosphate rock containing about 32% P₂O₅, in a form which is not soluble in water, is concentrated to a water soluble product containing 45% P₂O₅.

In this condition it is either applied directly to the soil or mixed with other fertilized materials containing nitrogen and potash to form a complete fertilizer.

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Estimates of the available tonnage of phosphate rock in Idaho credit the State with a tonnage exceeding that of the entire United States and indicate that this rock constitutes the greatest potential mineral wealth of Idaho. We quote the following table and statements pertinent to Idaho from U. S. Geological Survey Mineral Resources, Phosphate Rock in 1922, by George Rogers Mansfield, pages 114-116.

"The Government now has two extensive phosphate reserves, one in Florida and the other in the Western States.

"The western phosphate reserve was set up on December 9, 1908, when the Secretary of the Interior withdrew from all kinds of entry 4,541,300 acres of land in Idaho, Utah, and Wyoming. It has been considerably modified and reduced by subsequent orders based upon examinations by the Geological Survey in those fields, and a large area in Montana has been added to the reserve. The great bulk of the phosphate area in the states named is on public land, though some has passed into private ownership. The outstanding withdrawals on January 1, 1923, are indicated below:

<table>
<thead>
<tr>
<th>State</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utah</td>
<td>302,465</td>
</tr>
<tr>
<td>Idaho</td>
<td>720,534</td>
</tr>
<tr>
<td>Wyoming</td>
<td>995,049</td>
</tr>
<tr>
<td>Montana</td>
<td>287,883</td>
</tr>
</tbody>
</table>

2,305,931

"Of this land areas amounting to 261,971 acres in Idaho and 2000 acres in Wyoming have been examined in detail and formally classified as phosphate land. Similarly 5751 acres in Idaho, including 4060 acres in the Fort Hall Indian Reservation, and 23,293 acres in Wyoming, including 20,576 acres in the Wind River Indian Reservation, not embraced in outstanding phosphate withdrawals, have also been examined and classified as phosphate land. The total area of public land in the western field that may be regarded as containing workable phosphates therefore amounts to 2,334,975 acres. Not all this territory contains high-grade rock, but the estimates given below, which are conservative and incomplete, show that a vast tonnage of high-grade rock may be expected.

"Under the act of July 17, 1914, agricultural entries may be made upon withdrawn phosphate lands, but the mineral rights are reserved to the United States.

"In connection with the revision and extension of phosphate classification in the western field the original tonnage estimates for Idaho, Montana, and Wyoming have been revised. These estimates relate chiefly to the main bed and thus exclude some workable high-grade rock and much lower-grade material that may eventually become workable. Numerous areas of considerable size that may contain phosphate deposits at workable depths are also excluded because the phosphate rock is covered by later deposits that conceal the structure of the underlying beds, so that any estimate of the phosphate
content would be unreliable. Large areas of the lands withdrawn have not yet been examined, and hence no estimate of tonnage is available for them. It is believed, therefore, that the estimates here given are low and that when the withdrawn lands have been fully explored the total may be considerably increased.

**Estimate of phosphate rock in the United States available December 31, 1922, in long tons.**

<table>
<thead>
<tr>
<th>Field</th>
<th>Estimated quantity at end of 1915</th>
<th>Approximate quantity mined 1916-1922</th>
<th>Estimated quantity available</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eastern field:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arkansas</td>
<td>20,000,000</td>
<td>20,000,000</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>227,000,000</td>
<td>212,000,000</td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>1,000,000</td>
<td>900,000</td>
<td></td>
</tr>
<tr>
<td>South Carolina</td>
<td>9,000,000</td>
<td>8,800,000</td>
<td></td>
</tr>
<tr>
<td>Tennessee</td>
<td>88,000,000</td>
<td>85,000,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>345,000,000</td>
<td>326,700,000</td>
<td></td>
</tr>
<tr>
<td><strong>Western field:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idaho</td>
<td>$4,997,809,000</td>
<td>4,997,717,000</td>
<td></td>
</tr>
<tr>
<td>Montana</td>
<td>$273,785,000</td>
<td>273,785,000</td>
<td></td>
</tr>
<tr>
<td>Utah</td>
<td>96,750,000</td>
<td>96,745,000</td>
<td></td>
</tr>
<tr>
<td>Wyoming</td>
<td>$115,754,000</td>
<td>115,745,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5,484,098,000</td>
<td>5,483,992,000</td>
<td></td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td>5,829,098,000</td>
<td>5,810,692,000</td>
<td></td>
</tr>
</tbody>
</table>


$Figures revised to agree with later plan of classification.

Further data on phosphate rock by Bertrand L. Johnson and B. H. Stoddard, is contained in the Minerals Year Book for 1936, pages 931-945 inclusive.

Air Transportation and Mining

By REID W. ALLEN

Perhaps nowhere within the territorial limits of the United States has Aviation played the prominent part in the mining industry as in our own State of Idaho. Sections of the country, which, before the advent of air transportation, could only be classed as seasonal operations owing to the complete blocking of existing roads by snow, are now year around operations.

Early in 1927 the first airport was established to serve a mine during the winter months, while at the present time there are approximately eight or ten communities which receive all of their freight, mail, express, food and medical supplies via the air route.

Several communities were skeptical as to the reliability of the airplane in the extreme mountainous terrain of central Idaho during the winter months, but the airplane was given a trial and found to give such excellent service that it was substituted for the dog team for mail and express service into Stibnite, Warren, Burgdorf and many other communities.

The advantage of the time saved by using airplanes can be easily shown from the fact that from Cascade to Yellow Pine, Stibnite and on to Deadwood, it was formerly a four day trip while now it is only twenty-five minutes by air and the convenience of the two modes of transportation can not be compared.

Mining activities continue throughout the winter in Atlanta, Stibnite, Deadwood, Warren and Yellow Pine. Each of these communities is separated from the railroad by high mountain ranges eight or nine thousand feet above sea level. Owing to the early snows winter supplies had to be laid in early as the camps were snowed in except for intermittent service by dog-team or men on snow shoes or skis. Today not only the sick or injured are served by air transportation but passengers and mail are carried on scheduled trips.

Supplies and freight constitute the bulk of the business and now snow bound communities receive fresh vegetables, meat and eggs at regular intervals via the airplane. Repair parts for mining equipment, dredge buckets, shaft and gears and machinery are also flown in during the winter months. Recently a steel casting, weighing 3600 pounds, was flown from Boise to Atlanta for the St. Joe Lead Company.

While several of the mining companies have instructed and maintained their own landing fields, valuable aid has been given in some sections by the Civilian Conservation Corps and various Federal Relief Agencies.

At the present time not only is the airplane being used by the mining industry during the winter months, but operators have been quick to realize the tremendous saving of time which this mode of transportation affords. The Sunshine Mining Company in northern Idaho has an airplane which is used not only for light freighting work, but for the transportation of executives. The El Oro Placers, Inc., have constructed an airport adjacent to their property near American Falls and are contemplating the purchase of a ship in the spring, also for executive transportation.

During the winter months a schedule was maintained from Cascade into the mining district adjacent to Yellow Pine, Stibnite and Warren. From Boise scheduled trips are made into Atlanta, carrying mail, passengers, express and freight. In the north Idaho district many trips have been made from both Spokane and Lewiston into the remote sections of the Selway National Forests, which comprises eight major mining districts.

The development of air transportation in the State presents a very interesting story. Fields either located at or adjacent to mining operations are located at the following points: Atlanta, Cascade, Challis, Cayuse Creek, Chamberlain Basin, Dixie, Elk City, Moose Creek, Muscle Shell, McCall, Salmon, Stibnite, Warren, Cold Meadows, Big Creek, Soldier Bar, Bernard Creek, Cameron Ranch, Cape Horn, Yellow Pine, Land Mark and Bonanza Bar.
LANDING FIELDS

EARLY HISTORY OF AVIATION AS CONNECTED WITH MINING IN IDAHO

In November, 1930, George Stonebraker, who held the Government mail contract between Cascade and Stibnite, replaced dog-team mail delivery, requiring three days from Cascade, with airplane service requiring less than 30 minutes. That winter the Yellow Pine Co. lost its source of power through the freezing of its large hydroelectric power plant. The airplane service proved valuable as a gasoline-driven air compressor was substituted for the electrically driven compressor, and the gasoline was delivered by airplane. By making this substitution the company was able to continue driving its Monday tunnel without interruption. So far as the writer knows, this was the first time in the United States that gasoline has been so transported by air for power purposes in conducting mining operations.

Before the 1930-31 winter season ended air transportation was proved a success, and everyone knew that this mode of transportation was here to stay at least as long as mining activities continued.

The first star route airplane mail service to an isolated mining camp to be established by the United States Postoffice Department was between Boise and Atlanta, in November, 1931. Bennett Air Transport Co. of Boise was the successful bidder, and the contract called for delivery of 250 pounds of mail twice a week. Prior to this time winter mail, not to exceed 50 pounds, was carried once a week from Rocky Bar to Atlanta by men on snowshoes or skis. After this route was established and several days before the contract became effective, the operator made a special trip to Atlanta to carry out a forest ranger who had accidentally shot himself, thus incidentally proving the value of this service from a humanitarian standpoint.

PRESENT ROUTES

Today, instead of the one airplane operating between Cascade and Stibnite, there are five flying between the following points:

1. McCall and Warren.
2. Cascade to Deadwood, Stibnite, and Yellow Pine.
3. Boise to Atlanta.
4. Boise to Mountain City, Nevada.

AIR NAVIGATION FACILITIES

These routes did not spring up over night. Much planning was necessary for their successful operation. Airports and landing fields are required; housing facilities were necessary. Snow conditions had to be dealt with, and a means of procuring proper weather reports had to be provided.

At Cascade, a pasture about two miles from town was used as a landing field. This served very well as long as the rough ground was covered with snow, but something had to be done about conditioning it for use when there was no snow. Accordingly, during the spring of 1931 the land was taken over by the village. The State Aeronautics Division graded and leveled three runways. Later a hangar for housing his ships was constructed by the contract mail operator.

At Stibnite, which is situated in a narrow canyon, nature was kind enough to leave a piece of flat land directly in front of the mining buildings. This land was not very wide or very long, but the mine superintendent was quick to see its value as a landing field. Trees were cut and stumps removed. The ground was partly leveled, and the irregularities not ironed out were covered by snow. A wind directional indicator was installed, and the field, such as it was, proved ready for traffic. The traffic during the winter of 1930-31 used this small field, approximately 1,500 feet in length and 200 feet in width, successfully. There were times when it looked like a "crack-up" but each time the skill of the pilot proved sufficient to avert the danger. Later this field was widened and lengthened to 500 feet by 2,500 feet. During the summer mine tailings are flowed on the field, and eventually it will be as good as possible under existing topographic conditions.
At Yellow Pine, the flat land at the Fox farm, 6 miles south of town, was utilized. Little improvement work has been done on this field. At Deadwood, the airplane land on the frozen waters of the reservoir impounded by the Deadwood Dam. At McCall and Warren, cooperative construction by those interested made possible the landing fields. The Idaho Gold Dredging Co. contributed in a large measure to the construction of the landing field at Warren and the hangar at McCall. The management of the St. Joseph Lead Co. realized the advantage of air facilities and constructed the field at Atlanta in order to obtain this service. The mine officials at Mountain City, Nevada, the location of the discovery of a large new copper deposit during 1932, did likewise.

The terms of the Star Route mail contract between McCall and Warren do not permit transferring the winter mail to airplane for delivery, and, as the airplane operator does not hold the mail contract, flying trips are made on request, the ships being maintained at McCall and Cascade. Secesh summit between McCall and Cascade receives as much as 25 to 30 feet of snow during the winter. When it is considered that the traveler can ride along this road in summer and see blazes on the trees 30 feet above the ground, the difficulties encountered in ground transportation over this route during the winter can be readily appreciated.

During the winter airplanes made trips twice a week on this route carrying passengers and express. A large amount of heavy freight, such as dredge buckets and other dredging equipment, was hauled in. The airplanes on call this winter have a gross weight of 4,000 to 4,400 pounds and a useful load of from 1,600 to 1,700 pounds. Six passengers and their baggage may be carried comfortably in heated cabins.

CASCADE TO DEADWOOD, STIBNITE AND YELLOW PINE

Mail trips are scheduled twice a week on this route and additional trips are made on call. The round trip is made in approximately one and one-half hours flying time.

An average of 30 passengers, 2,500 pounds of mail, and 4,000 pounds of express and freight are carried each month on this run.

In January 1932, when the break occurred in the oil line from the storage tank to the mill of the Yellow Pine Co., at Stibnite, and the stored oil ran to waste, in order to continue operating the mill it was necessary to procure additional fuel oil. Three airplanes in approximately 10 days transported 20,000 gallons of oil from Cascade to Stibnite, and the company was enabled to continue operations.

BOISE TO ATLANTA

Mail trips are scheduled twice each week on the run between Boise and Atlanta, and additional trips are made on call or when loads demand it. Approximate air time required for the trip is between 35 and 45 minutes, depending upon the wind.

It must be remembered that the Boise Airport is free of snow, while at the other end of this run there is usually from 3 to 5 feet of snow on the field. It is therefore necessary to use wheels on the plane instead of skis. A combination wheel-ski arrangement might be used, but this equipment is heavy and cuts down the useful load of the ship. Therefore it is evident that the Atlanta Field must be maintained in a condition to receive winter traffic on wheels instead of skis. When the method of keeping the Atlanta field in condition was being considered, the suggested practice of clearing runways with snow plows was discarded as impractical. Pusher Plows were not feasible, because of the immense amount of snow to be moved to clear the runway to the desired width, from 150 to 200 feet. Rotary plows were not available. Apprehension as to the additional hazard of these piles of snow to aircraft operations, as well as damage to the field during spring thaws, definitely ruled out this method. Compacting by rolling appeared to be the most feasible plan, as it was believed that such a compacted runway would not only be economical to maintain but would be swept clean by the wind and not drift full of snow. A roller with varying weights, which would work equally well when the snow was dry
and heavy (like sand), light and fluffy, or wet was necessary. One with a light drum or cylinder was constructed, part of the weight being built into the framework, and bags filled with sand being added when more weight was desired. To secure compactness the field was rolled twice and again rolled after each snowfall of 3 or 4 inches. When the rolling did not produce exactly the desired results with the cylinder running free, it was blocked and dragged up and down the field. From the air, the rolled portion presented a dazzling whiteness in decided contrast to the unrolled portion of the field. (Note picture). To permit a better judging of distance when approach to the field was made, red flags were placed along the edges of the rolled area.

SUMMARY

Is the service worth while?

Let us consider the intangible economic results, those factors which bear on the general welfare of a community, but which are hard to measure by monetary standards. Living conditions in the camps have improved, now that fresh fruits, eggs, vegetables, and meats are available, mail and express are frequent, and in case of accident or sickness all medical and hospital facilities of the city are within an hour's distance. The peace of mind these facts afford the workers is making them more satisfied and is increasing their efficiency.

There are also tangible economic results. The facility with which the injured or ill can be rushed to Boise makes the maintenance of a hospital or physician at the camps unnecessary, thus effecting a considerable saving; meat delivered by airplane is cheaper than stock driven in, fed, and butchered during the winter, and this practice was entirely discontinued during the winter of 1932-33; and third, suspension of operations can be and has been frequently prevented by timely use of the airplane.

In the winter of 1931-32 when the Yellow Pine Co. at Stibnite suffered the loss of its fuel oil, either more oil had to be procured or the mill could not be started. The oil was brought in by airplane without any delay, and the mill was put in operation. The same winter at the same mine, the ability to procure a large shafting prevented suspension of operations.

An important gear driving the dredge stacker belt on the dredge at Warren was broken. A new gear was ordered and delivered at the dredge an hour and a half after it was received at the flying field at McCall. Had air transportation not been possible, the dredge would have been shut down at least four days longer.

The hoist at the mine of the St. Joseph Lead Co. at Atlanta was irreparably damaged. A drum containing a new clutch was ordered by telephone from the factory. When it arrived in Boise in April, 1932, its assembled weight was 1,400 pounds, and it was too large to go through the door of the airplane. It could not be taken over the mountains except by airplane, as travel by horse and sleigh was not possible, and it was too heavy for dog team and sled. The drum was stripped of all detachable parts; this reduced the weight to slightly more than 800 pounds, but even then it would not go through the door of the airplane. A method was finally devised. The drum was slung under the ship and so transported to the mine without any difficulty. Complete closing until June, 1932, was thus avoided.

CONCLUSION

Great credit is due the hardy pioneers of the Air Trails of Idaho which lead to the isolated mining camps. Through their courage and foresight there has been established a network of air lines into the mountains of Idaho. Not only are regular schedules maintained to the communities already mentioned, but trips are made to many small camps in other isolated sections, and errands of mercy to prospectors with frozen feet or illness have many times been made without remuneration. Thus another epoch in transportation history is being made as the citizens of Idaho sit in their warm offices and homes and hear the roar of the airplane as it flies overhead toward the snow-bound mountain fastnesses.
Mine Rescue Work in the Coeur d'Alenes During 1936

By James Wilson, Director

The Central Mine Rescue Station is located in Wallace, Idaho, the approximate center of the mining district of Shoshone County, long famous for its production of lead, silver, zinc and copper. Other ores found include gold, antimony and tungsten. Shoshone County boasts the first, third and fifth largest lead producing mines in the United States, the Bunker Hill, Morning and Hecla mines. The largest silver producer, the Sunshine, is also located in Shoshone County. There are a large number of other mines either in the production or development stage.

The Central Rescue Station is housed in a railroad coach instead of a building as this will allow it to be sent directly to the scene of the fire at any mine served by a railroad. This is a very definite advantage as it reinforces the equipment on hand at the mine by all the equipment of the Central Station. The car itself was inspected by the Union Pacific and necessary repairs made to keep it ready to move at a moment's notice.

Mine rescue training has been carried on regularly at the various mines; new men being trained to replace those leaving, and additional training being given men previously trained. During the winter first aid training under the direction of a United States Bureau of Mines representative will be given at the different mines, this training being open to all employees both surface and underground.

All equipment in the district is given frequent inspection and replacements made as needed. In case of fire at any of the mines a large amount of fire fighting supplies would be concentrated at the fire in a very short time.

Oxygen breathing apparatus, commonly known as safety helmets, are a rather complex device and a complete course of training is necessary before their use can be undertaken with safety. Such courses are held during the year at the various mines of the district, a complete course consisting of four classes of four hours each. The men taking the course are paid by the company for whom they work for the time thus spent. A half hour course in First Aid is a part of each day's instruction. A crew of trained helmet men with sufficient equipment is a very real asset to any mining company. Mine fires, in common with surface fires, can often be placed under control if taken in hand at once, but with any considerable delay, the fire has often gained such headway controlling it is frequently a long and costly process. Such conditions in the majority of cases mean the shut down of the mine as
far as production is concerned, with the accompanying loss of work for the men and revenue to the company.

Helmet men are chosen for their physical fitness, their ability to think for themselves in any emergency and must also be familiar with the mine as a whole or with some particular portion or operation. These men are trained in crews of five, the largest number that can be handled with maximum efficiency. The course covers the principles, construction, and tests of breathing apparatus. Thus the men become familiar with the machine which they will wear, perhaps at a time when such knowledge or its lack would mean life or death, not only to themselves, but to others. The final portion of the course requires the wearing of the helmet either in smoke or formaldehyde gas with a normal amount of labor being performed. The men are also instructed in the care, cleaning, and sterilization of the equipment. Upon completion of the initial course, additional hours of training are given at intervals to enable the men to keep in practice and to acquaint them with new methods and equipment.

The standard apparatus in use in the Coeur d'Alene district is the type known as the "Paul." It costs two hundred and seventy dollars per set, weighs about forty pounds, and will last when fully charged under ordinary working conditions about two hours. As the "Paul" is an automatic feed machine, this period varies with the individual and the amount of work done. Machines have been worn in tests by a subject at rest for a period of fifteen hours.

In a closed circuit machine, such as the "Paul," the wearer breathes into and from a bag having no connection with the outside air, and in which the pressure is slightly higher than normal atmospheric pressure. For this reason, if a leak should develop, the oxygen would tend to escape without poisonous air being admitted to the machine. In this type of apparatus, the wearer breathes through two flexible tubes on either side of the breathing bag, which
is carried on the chest when in use. These tubes terminate in a rubber mouthpiece having a rubber flange fitting between the teeth and the lips which is held in place by four straps attached to a “Safety” hat. A spring clip is placed on the nose so all breathing is done through the mouth.

The exhaled air passes downward through the left-hand tube to a regenerating can for purification. The caustic soda, or cardioxide, in the can absorbs the carbon dioxide gas, after which the purified air is passed through a cooler and thence back to the breathing bag where it is mixed with fresh oxygen. The oxygen supply is carried in a steel tank mounted in the frame of the machine and is carried on the back. The oxygen in the tank is under a pressure of over two thousand pounds per square inch, the pressure being reduced by a reducing valve before being admitted to the breathing bag. The reducing valve is controlled by another valve which is automatic in action and admits oxygen in any amount necessary for the wearer. By means of a by-pass valve, the high pressure oxygen may be admitted directly to the breathing bag in case of failure of either of the above valves. A finimeter gauge is also provided by which the wearer knows at all times the amount of oxygen remaining and is thus enabled to get out in time.

Twelve sets are carried on the Central Rescue Station car, together with a large amount of repairs and accessory equipment. This includes extra oxygen bottles for the machines and large storage tanks of compressed oxygen for refilling the small tanks. High pressure oxygen pumps are used for charging the small tanks, both electric and hand driven pumps being available. Regenerating cans for the purification of the exhaled air, as well as an ample amount of spare parts for the apparatus, repair materials, etc., are kept on the car. Various devices for testing the apparatus such as flow meters, pressure gauges, etc., are in frequent use. There are also a number of devices for testing for the various poisonous gases which may develop from mine fires, such as carbon monoxide, carbon dioxide, and methane or Marsh gas. Inhalators and resuscitating devices are used in conjunction with
the Schaefer method of artificial respiration. Battery type searchlights are used by each helmet man. Large portable searchlights equipped with one thousand watt globes are fitted for use on the regular mine power lines and with long cables can be easily moved. This together with numerous regular and special types of fire hose fittings allow prompt and efficient action in case of fire.

In addition to the above equipment, each of the large mines of the district is equipped with from five to ten sets of oxygen breathing apparatus together with a supply of spare parts, regenerating cans, etc. In the event of a major fire in the district all equipment in the district could be concentrated at the fire in a short time.

During the past year approximately one hundred and sixty men have received training and review work. The Sunshine Mining Company started mine rescue training last year and has trained thirty-five men. Two hundred twenty-one men have received first aid training certificates upon completion of training. The Sunshine has taken an active part during the year in the training of men in both mine rescue work and first aid.

In addition to the Sunshine, men are being trained at the Jack Waite, Page, and Morning mines of the Federal Mining & Smelting Co., the Crescent and Bunker Hill mines of the Bunker Hill & Sullivan M. & C. Co.; the Hecla and Polaris mines of the Hecla Mining Co.; and the Star Mine, jointly owned by the Hecla and Bunker Hill.

Upon completion of the first aid course now being conducted, approximately seventy-five per cent of the men in the district will have received United States Bureau of Mines First Aid Certificates. About one hundred and sixty men will have Mine Rescue Certificates, and in addition there are quite a large number of men trained at previous times who have one or both types of certificates. Thus it will be seen that the mines of the district are well equipped both as to trained men and equipment for any emergency.
Men Employed and Wages

Better metal prices during the year 1936 had a stimulating effect on activities and more men were engaged in mining than for many years. Those operating, maintained a payroll which showed a decided increase in number of men employed and maintained a scale of wages equal to, and in many instances better than were paid in mining districts of other states.

There was an ample supply of labor throughout the year, and the turnover was comparatively small, so that operating companies were assured a constant working force of experienced men, without the necessity of breaking up the personnel with new and inexperienced crews.

It is practically impossible to obtain complete and accurate statistics of the number of men employed in the mines; a great many are employed by prospectors and small companies which do not maintain continuous work and do not report to the inspector of mines; and the different reports filed by mining companies vary as to the number of days. A conservative estimate covering all mining operations in Idaho for the past year would total approximately 6800. This figure includes men getting out timber for use in mines.

The Coeur d'Alene district, where the deep seated lead-silver-zinc mines are located, accounted for more than half of this total and maintained production on a five-day weekly basis.

Under an agreement adopted on November 16, 1925, the wages in the Coeur d'Alene district were to be adjusted each month in accordance with a bonus rate based on the selling price of lead in New York. This scale was based on a wage of $3.75 per day for miners when lead is selling under 5½¢ per pound; the bonus to graduate upward for each additional half cent added to the purchase price.

If the bonus scale had been adhered to in recent years, wages would have been cut to a point entirely out of proportion to wages paid in other parts of the state and too low under high living costs, so the signatories to the bonus scale waived their agreement.

Wages in the state are not uniform. The following is the rate for the Coeur d'Alene district from June 1, 1935 to Nov. 16, 1936, when another 50-cent bonus was added to the prevailing scale. Placer and hydraulic miners are classed as surface workers and receive less remuneration. The several gold mines have their own individual scale for their particular operation.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miners</td>
<td>$5.25</td>
</tr>
<tr>
<td>Shovelers</td>
<td>4.75</td>
</tr>
<tr>
<td>Timbermen</td>
<td>5.75</td>
</tr>
<tr>
<td>Timber helpers</td>
<td>5.00</td>
</tr>
<tr>
<td>Machinists</td>
<td>6.00</td>
</tr>
<tr>
<td>Machinist helpers</td>
<td>5.00</td>
</tr>
<tr>
<td>Carmen</td>
<td>4.75</td>
</tr>
<tr>
<td>Motormen</td>
<td>5.50</td>
</tr>
<tr>
<td>Trainmen</td>
<td>5.00</td>
</tr>
<tr>
<td>Main hoistmen</td>
<td>6.50</td>
</tr>
<tr>
<td>Small hoistmen</td>
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<tr>
<td>Nippers</td>
<td>5.00</td>
</tr>
<tr>
<td>Shaft men</td>
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</tr>
<tr>
<td>Pump &amp; compressormen</td>
<td>$5.50</td>
</tr>
<tr>
<td>Surface laborers</td>
<td>4.50</td>
</tr>
<tr>
<td>Ore sorters</td>
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</tr>
<tr>
<td>Cagers</td>
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</tr>
<tr>
<td>Pipe and trackmen</td>
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</tr>
<tr>
<td>Shift bosses</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<tr>
<td>Mill swappers</td>
<td>4.75</td>
</tr>
<tr>
<td>Carpenters</td>
<td>6.00</td>
</tr>
</tbody>
</table>

Other employees are generally on monthly salary—Office men, assayers, engineers, foremen and superintendent.

The cost of board and room at company boarding houses, hotels, and at private homes average from $1.25 to $1.50 per day. Many companies have built and are maintaining houses which are rented to their married employees, and some of the largest companies assist their employees in the construction of homes.

Many flagrant abuses have been noted during the year in the failure of labor and materialmen to be reimbursed for services rendered. This condition should be remedied, and legislation enacted that would give more protection to labor and materialmen in Idaho. These facts will be presented to the 24th session of the State Legislature when it convenes Jan. 4, 1937, for consideration.
Safety Rules and Regulations

GENERAL

In handling Carbide, do not approach carbide containers with an open light. There may be an accumulation of gas, which might explode.

Do not crowd or jostle your companions in getting on or off cage. No playing or scuffling will be tolerated on stations or on cage.

Smoking will not be permitted on cages at any time.

When the shift is being lowered, or hoisted, all men on the cage must be alert.

No lighted lamps will be permitted on cages, except that cager may carry a light.

No one shall pull the electric signals or bell rope, except the cager, unless the hoistman has been previously notified. Then touch the signal bells only when the cage is spotted for you. After calling for a cage, either on the flash or on the phone, wait until the engineer spots cage and flashes you to get on. This flash will be several short flashes, followed by the station signal from which you called.

Tools of any kind will not be allowed on the cage when lowering or hoisting the shift.

No employee shall leave the shaft at any station without first seeing that the bars and doors are all closed and placed in position so as to prevent accident.

When traveling through a haulage drift, look out for trains at all times. Always be sure that you are standing in a safe place when the train is passing.

Use care in passing under manways, slides and chutes. Something may drop on you.

No one except those employed thereon, will be permitted to ride on storage battery locomotives, trucks or ore cars, and motormen are instructed to refuse to move their trains if anyone insists on riding thereon.

Each man must ascertain, by a careful examination thereof, that the particular place in which he is employed is safe. If found to be in an unsafe condition from any cause whatever, measures must be taken to remove such danger at once and before proceeding to work, and if necessary, the Shift Boss or Mine Foreman must be notified.

When returning to any place after a blast, or blasts, each employee, upon entering such place, must make a careful examination for any loose rock or other element of danger by which he could be injured, and if any such be found, he shall immediately make it safe, or if unable to do so himself, shall report the same to the Shift Boss or Mine Foreman. Excepting that only the Timberman or Miner, depending upon the location of their work, shall be permitted to "bar down."

It is the duty of each employee to warn his fellow employees and boss of any danger which threatens, or which may appear to threaten to cause injury to any person, or to the property of the Company.

Any machinery noticed to be defective must not be used until fully repaired by competent mechanics, and no one is permitted to run or operate any machine not in his charge, excepting timber hoists, unless authorized by the Foreman in charge of his department.

It is the duty of any employee seeing or knowing of any winze or raise, or any opening to be unprotected or uncovered, except the shaft, to protect, cover and make the same safe or to report it to the Shift Boss.

It is the duty of employees to take sufficient time to make the examination required in these rules, and to guard against any danger from accidents in the mine or its workings.

Do not leave timbers with projecting nails anywhere where anyone can step on, or bump against them. Bend the nails down and place the timbers securely out of the way.

Do not drive nails in timbers and leave them projecting in such a way that they may catch and injure someone passing by.
Do not attempt to cross an opening through which rock is running. Stop, call to the workman above, and wait until no more rock is passing.

Do not attempt to travel through stopes immediately after blasting time. Before proceeding, wait at least fifteen minutes after all shots have gone off.

Place sufficient footboards and guard rails over all open raises to provide a safe passage-way, and also around holes in the stopes when muck is being let down from the floors above.

The insulation on electric wires cannot be depended upon to protect you from shocks.

So far as possible, treat all electric circuits as though they were "live" even though you believe them to be dead.

Employees must learn the different openings to the surface from their working places. Maps showing these openings will be placed at convenient places throughout the mine.

Do not throw refuse food around the working places, or on the sill.

Dump carbide lamps in a mine car, if possible. Never practice dumping it in the same place around manways, stations or other working places, except in receptacles provided for that purpose.

Do not dump carbide in wet places, especially in the ends of drifts and crosscuts where there is a slow movement of air. This gas is highly explosive.

Do not hang carbide lamps in such a position that the flame is directed towards timber. The heat of a carbide flame may kindle a fire several inches away from the end of the flame.

Provide yourself with a water-proof match box and keep it filled with matches.

Should you be caught in the mine without a light, and unable to secure one, do not move around in the dark. Stop immediately and wait for someone.

Do not stand in a strained position, or with feet spread apart, when lifting. Lift with muscles of thigh and legs, and not with the back.

Smoking underground is not prohibited, but you are requested to use extreme care in smoking, that no fire may be caused thereby. Do not smoke in dry, timbered places, where, if you dropped your cigarette or pipe it would start a fire. Be sure your cigarette is absolutely dead before you throw it away.

No man is permitted to go to work if under the influence of liquor and drinking liquor on shift is strictly prohibited.

Report all accidents, no matter how slight, to your Shift Boss. Remember that a slight scratch, or cut, may become infected if not properly cleaned and dressed.

Do not talk to anyone operating a hoist while the hoist is in motion. The hoistman should have his entire attention upon his work, and should not be disturbed.

**SHIFT BOSSES**

It shall be the duty of the Shift Boss to enforce the rules contained herein, and if the remedy is out of his jurisdiction, he must report the same to the Foreman immediately.

If a dangerous condition is reported to the Shift Boss by any one of his crew, it shall be the duty of the Shift Boss to immediately ascertain if such danger exists, and to remedy the same if possible, or to immediately call the Mine Foreman or the Mine Superintendent.

All working stations and working drifts must be well lighted, and kept in a clean and orderly condition.

Station turn-sheets must be free from timbers when the shift is being hoisted, or lowered.

No one man shall be put to work by himself underground. There must be someone within calling distance.

Timbers squeezing in on the track should be repaired at once.

The back of timber sets should be lagged tight, and side lagging used when necessary.

When drifts and crosscuts are not timbered, backs and sides must be kept barred down.
In holing into workings that are used for travel, all directions leading to the place to be holed through should be guarded during the blast. Ladders must be kept in good repair, and broken ladder rounds replaced as soon as possible.

Guard rails, chains or grizzlies must, where possible, be provided at all places where it might be possible for a man to fall into a manway, timber-slide, chute, stope, shaft or gob.

Manways must be kept free from obstructions and made safe from the falls of rock, by lagging the walls wherever necessary.

Ladders must project 18 inches above floors, or otherwise hand rails must be provided.

All manways in daily use shall be cleaned of all loose rock, and kept in a safe condition.

**SHAFTMEN AND CAGERS**

No tools or other loose material, excepting mine timbers, may be placed closer than five feet from any shaft, where such material is likely to cause stumbling, or is likely to be pushed into the shaft.

All shaft stations must be provided with proper guard rails or gates, and these must be in place to guard the shaft at all times, except when the cage is spotted at the station.

All hoisting ropes, cages, king bolts and safety catches must be regularly inspected by a competent person, and must be regularly oiled and kept in proper condition.

The cagers and top men shall keep a careful watch over the cages during their shift's work, and immediately report all defects and have them repaired, if necessary, before continuing their work.

A careful inspection of the shaft must be made immediately after any spill of muck or other material down the shaft, and cages or skips shall not be operated until such inspection has been made.

No person shall get off, or on, a cage, skip, or bucket while the same is in motion, or after the signal to move has been given.

No smoking will be permitted on the cages at any time.

No lighted lamps will be permitted on cages, except that cagers may carry a light. Shaft Repairmen will also be permitted to carry lights.

When lowering, or hoisting the shift, all safety doors must be closed and all screens must be in place.

Tools of any kind are not allowed on the cages when lowering or hoisting the shift.

Not more than nine men will be allowed to ride on the deck of a cage. All guides and shaft timbers must be inspected daily by a competent person.

In no case shall men and material be placed on a cage, unless such material is placed in the special box provided for the cage. This box shall not be used when handling the shift.

No open lights shall be used by cager when oil, cotton, waste or other highly inflammable material is being carried.

When tools, timber or other material are to be lowered, or hoisted, in a shaft, their ends, if projecting above the top of the bucket, skip, or cage shall be securely fastened to the hoisting rope or to the upper part of the vehicle.

No hoisting shall be done in any compartment of a shaft while repairs are being made in that compartment, excepting such hoisting as is necessary to make such repairs.

Men working in shafts shall have a suitable covering to protect themselves from material falling down shafts. They shall instruct all hoisting engineers on duty at the time with respect to the place and nature of the work, so that the cage will not be let down upon them. They shall have their working platforms of sufficient size and strength to safely carry on their work.

**MOTORMEN AND TRAINMEN**

Motormen must keep their trains under control at all times and operate them at a safe rate of speed. This rate of speed shall not exceed eight (8)
miles per hour on straight track, or five (5) miles per hour on curves, or when passing switches, or when passing repairmen working on levels.

Defects in tracks, drifts, chutes, switch signals or drift lights must be reported at once to the Shift Boss or Mine Foreman.

All trainmen operating large cars coupled with a link, must use a stick, instead of their hands, when coupling cars.

Ore pockets must be provided with a suitable cover to be used when no dumping is being done.

All underground motors shall be provided with a gong or siren.

No one except those employed thereon, will be permitted to ride on storage battery locomotives, trucks or ore cars, and motormen are instructed to refuse to move their trains if anyone insists on riding thereon.

Do not place long tools or materials on motor or on cars. Use a truck.

Do not push trucks ahead of motor or train.

Do not go up into a chute where ore or rock is hanging, in order to blast it. Do your work from the manway by taking out a lagging, if necessary.

There must be a light on the front end of all trains which are being pushed into a drift.

Motormen, or men running motor, shall report to the Electrician and to the Shift Boss or Foreman, any defective condition of the underground electrical equipment.

Motormen and trainmen must both carry lighted carbide lamps, with a clean reflector.

Do not ride on coupling bars between cars or trucks.

When a train is backing into a drift, trainmen must be at the back end of train and be prepared to stop train in case of danger.

Do not get on, or off, the front end of a moving train. Remain in your place until the train stops.

Do not stand upright on moving trains. Look out for chute lips and low timbers.

Motors and cars with defective brakes must not be operated. Any motormen finding such defects must report them at once to the Shift Boss.

Defective cars must be dropped from the train and placed on the car repair track, and also reported to the Car Repairman.

Do not climb over, or between cars when train is moving.

Do not try to adjust couplings when cars have collided and all cars are moving.

Do not hold open light over storage battery.

A bar placed across the track and having a light, or sign, mounted on it, indicates that the track is temporarily closed, and no one except the person who placed it there is permitted to remove or tamper with such a bar.

When blasting choked chutes, warning must be given in all directions, including up the manway, so that no one may come opposite, or too near such chute at time of firing.

The following signals must be used in operating trains:

**Whistle Signals**

Stop (if in motion)...........................One blast
Proceed (if at rest)..........................One blast
Back up.......................................Two blasts

**Lamp Signals**

Proceed..................Raise and lower lamp vertically
Stop..........................Swing lamp horizontally
Back......................Swing lamp in vertical circle across track

A train shall always be considered as going ahead, or proceeding, when the motor is pulling the cars, and as backing up when the motor is pushing the cars.

Trainmen must heed all blasting signals.

The trolley pole must follow, instead of lead the motor, except in cases where it is impossible. The motor must go slowly when it is necessary to have the trolley pole ahead. The trolley pole must not be turned while the motor is in motion, unless necessary.
Where block signals are installed, they **must be used** whenever a train is operated.

Never enter a block unless the same is clear, with the signal lights dark. Never run in a block unless the light ahead of you shows green. Never run against a red light, or with the block dark.

Be sure that the block is clear, or dark, when you leave it.

Trainmen shall remove explosives from the shaft stations at once.

Motormen and trainmen are required to leave the ventilation doors in their proper position when not passing through such doors.

**TIMBERMEN**

Timbermen should take special note of working conditions around them, and if any Miner, Shoveler, or Trammer is following an unsafe practice, he should inform them.

When entering a stope the first thing to be done is to examine the floors and see that all have a safe bearing.

Clean the working floors first, before barring down.

Keep all unused tools and other working material stacked neatly back out of the way while working.

Don't build flimsy, unsafe stagings. Make them strong.

Guard rails should be installed in manways on landings to prevent anyone falling into the timberslide.

When hoisting timber, or material, stand back out of the way in case something comes back down the slide.

Ladders must be kept in good repair and broken ladder rounds replaced as soon as possible.

Guard rails must be provided at all places where it might be possible for a man to fall into any opening.

Don’t work under loose ground. If in doubt report to Shift Boss.

Lag over each set as you put it in. The back of timber sets should be lagged tight, and side lagging used when necessary.

Timbers must be watched and kept safe.

Brace securely all timbers in the course of erection, so that they can not fall.

Handle your tools and endeavor to stand so that neither you nor your partner may be struck by a missed, or glancing blow.

Men are warned against going down a chute to repair it without first notifying the men above, and then the chute must be securely lagged over.

Give ample warning when dropping timber through raises and through holes in stapes, and see that there is no one in danger below.

No timberman or repairman, or helper, is allowed to stick an axe, or any sharp tool of any kind up high on a timber. Place them in a post not more than one foot from the floor.

When lowering timbers through timber-slides, all timbers must be securely fastened with timber chains or timber dogs. All timber dogs, chains and steel buckets must be fastened to the cable with a clevis, and in no other way.

When repairing in drifts, where trains are running, there shall be no trucks, or timber left on tracks. Repairmen must see that track is clear when train is coming. If not clear, train must be flagged in plenty of time and distance for the train to stop.

Posts should be framed on floor and not on horses, and should be securely blocked.

In passing tools from one floor to the floor above, the end opposite the handle should be passed up first.

**MINERS**

Miners should take special note of working conditions around them, and if any Shoveler or Trammer is following an unsafe practice, he should inform them.

Examine the back and sides before going to the breast, as the blast may have loosened something that was previously considered safe. Be sure that no one is under you when you are barring down.
RULES AND REGULATIONS

Keep floor clean behind you so that in stepping back you will not stumble. Keep all unused tools and other working material stacked neatly back out of the way while working.
When entering a stope see that the floors have a safe bearing.
Bar down before starting to set up.
Don't drill in loose ground without first making it safe by barring down, or timbering.
Examine the back and face and see that there are no missed holes before drilling.
Don't drill from an improper staging. Make it strong.
Don't drill from an insecure set-up.
Miners and timbermen, depending on the location of the work, shall be responsible for the safety of the roof and walls in their working places, and shall not permit a Shoveler to work under a place until it is considered safe.
Keep your machine properly oiled.
Steel should not be thrown down manways. It should be lowered with a rope, or passed from set to set.
Never blast at any time except blasting time, without special permission from the Shift Boss, and then only when employees in the vicinity have been properly notified and all possible entrances guarded.
When drilling with "stoper," stand in a proper position so that balance will not be lost if steel breaks.
The back should be watched while drilling, and any loose boulders should be barred down.
Read special rules under blasting.

SPECIAL BLASTING RULES

Don't be careless with powder. You might "get by" with it, but remember that it was made to explode.
Don't blast without giving proper warning and guarding all approaches.
Never blast unless you have a man with you.
In loading holes, don't leave powder and primers together in the face.
Bosses should notify men when they are close to other workings so that men working therein will not be in danger from blasts.
In tamping drill holes use only wooden loading sticks. Do not tamp by strokes, but by direct and steady pressure.
Miners in drifts and crosscuts shall count their shots and record any missed holes on the blackboards furnished for that purpose, and the blackboards must be examined by the shift coming on, for such reports.
Working places, with missed holes, shall not be entered for at least 30 minutes from the time of spitting. When necessary to fire a missed hole, do not attempt to extract the charge, but insert a fresh primer to fire it.
Caps or primers should not be stored with explosives.
Caps or primers should not be transported in the same vehicle or carried in the same case with dynamite or other explosives.
Powder and primers must be kept separate when being hoisted in stope.
Any powder not used by the miner on his shift, must be taken to the place prepared for the purpose. Leaving powder or primers in a working place will not be tolerated.
It shall not be permitted to carry explosives on electric locomotives, or in a car next to an electric locomotive.
Explosives should not be placed near "live" electric wires.
The fuse used by most companies burns at the rate of not less than thirty (30) seconds per foot in length. No fuse shall be used of a shorter length than five (5) feet.
Miners must not carry powder or caps in their pockets or boots. Whenever less than one stick of powder is used, the stick must be cut with a knife, and not broken without cutting.
When electric primers are used, all shots must be fired from a blasting box, approved by the electrical department.
This blasting box shall be kept locked at all times, except at the time when the shots are fired, and the key to the blasting box shall be in the possession of the man in immediate charge of blasting.
MINING INDUSTRY OF IDAHO

SHOVELERS

Don't work under bad ground. See that the floor is tight over your head.

Be sure that grizzlies on chutes are well blocked, and guard rails in, before starting to muck.

All muck holes in floor must be closed when the loaded car is trammed to the chute.

Always look out for powder and caps in the muck pile.

TRAMMERS

When space will permit, timbers or other material should not be piled closer than two feet from rail of track that is used for tramping.

Cars should not be left in places where they will unduly restrict the air currents or cause collisions.

All dumping places shall be protected when not in use.

Care must be taken in wedging cars when dumping at the chute.

TIMBER RUSTLERS AND NIPPERS

Powder magazines must be kept dry and well ventilated and free from rubbish.

Powder and caps should be kept at least 100 feet apart, and not on a main haulage way.

Powder, caps or fuse shall not be left in any stope, raise or drift or other place, except in the powder magazine or fuse station.

Use only wooden mallet and wooden wedge to open powder boxes.

When hoisting timber or material, stand back out of the way in case something comes down the slide.

It will not be permitted to hoist powder in any way in a timber slide, except in the bucket.

It will not be permitted for any employee to ride in any steel bucket, or in a timber slide, unless it has been fitted as a cage-way.

Steel shall not be thrown down manways. It should be lowered with a rope, or passed from floor to floor.

In hoisting or lowering timber or tools in a slide, they should be securely lashed and care must be taken that no one below is in danger.

Drills, timber, or other material must not be placed within five feet of any timber slide.

ELECTRICIANS

Do not handle "live" wire unless necessary, and then only those whose voltage does not exceed 440 volts.

All wires should be considered "live" at all times, and should be handled as if "live."

Insulation on wires should never be depended upon for protection. Do not handle "live" insulated wires unless suitably insulated yourself.

All high voltage apparatus, such as switchboards, hoist controls, etc., which are dangerous, must bear signs conspicuously displayed, advising of the danger.

All metal parts of electrical equipment which are not conductors, must always be permanently grounded.

Every man should have a good knowledge of the methods of artificial respiration.

Do not close any circuit without full knowledge concerning the circuit and the reason for the switch being open.

When switches have been opened to allow work on circuit, danger tag must be attached to switch. This tag must bear the name of the man opening switch, and the same must not be closed except by his instructions.

A man shall never do "hot work" alone, but must always have a helper. The helper must always be instructed what to do in case of accidental contact by the journeyman.

No person, whose duties do not require them to do so, must ever handle, or attempt to repair any electrical wires or equipment.
RULES AND REGULATIONS

TO A NEW EMPLOYEE

You are just beginning work here and we are anxious to make you a loyal and efficient member of our organization. In order to do this we must have your co-operation. You will find the Safety Department, your Foreman and Shift Boss and your fellow workmen willing to help you in becoming familiar with your work, and the precautions necessary to guard you against preventable illness and injury. Don't hesitate to ask for information when required.

TO AN OLD EMPLOYEE

You were once a beginner, and no doubt would have liked to have some one take an interest in you the first few days of your employment here. Please try and help the new man to learn the work and the safe method of working.

FIRST AID

When a man has learned five simple but practical points in First Aid he may at any time be able to save the life of a fellow workman. These five points are:

1. How to stop serious bleeding.
2. How to avoid infection or blood poisoning.
3. How to splint and otherwise treat broken bones.
4. How to recognize and treat for nervous shock.
5. How and when to give artificial respiration.

The following are some of the most necessary things to do:

If you see blood spurting from a wound, you may stop it by applying pressure with your fingers in the following manner:

1. If the wound is in the scalp, apply pressure just in front of the ear.
2. If the bleeding is in the arm-pit, apply pressure with your thumb in the hollow between the collar-bone and neck.
3. If the bleeding is in the arm apply pressure with your fingers along the inner seam of the coat sleeve between the large muscles of the arm.
4. If the bleeding is in the leg, at or near the groin, apply pressure in front directly over the hip joint.
5. If the bleeding is below the knee apply pressure with your fingers just back of the knee joint.

You will have to hold points 2 and 4 until the doctor comes, but you may tie a tight bandage with a pad over the pressure points 1, 3 and 5. This is called a tourniquet.

Any time the skin is broken, no matter how slight, there is danger of infection. To avoid this you should not wash the wound or touch it with anything except sterile gauze. Do not apply any medicine or salves except to paint the wound with iodine and always cover it thoroughly with sterile gauze. Do not put any iodine on the gauze and put only one light coat of iodine on the wound. Let the doctor do the cleaning. Don't use iodine when the flesh is badly lacerated or torn, as in deep wounds.

When you see a man with a broken bone, do not move him more than is absolutely necessary. Examine the injury and if the bone sticks through the skin, apply a sterile gauze dressing and stop the bleeding, if any, then tie the broken bone with splints made of wood with plenty of padding, in such manner that the broken part cannot move. If the bone does not stick through the skin apply the splints without a sterile dressing. If you are in doubt that the bone is fractured, treat it for a fracture.

Nervous shock is a condition of the nervous system caused by injury or fright and is sometimes very dangerous. When you see an injured man with a pale face, trembling or talking excitedly, lay him down with his head low, cover him with blankets, keep him warm, give him fresh air, hot coffee, hot tea, or other stimulant and get him to a doctor as soon as possible.

ARTIFICIAL RESPIRATION

Artificial respiration should be given only when a man is unconscious from electric shock, gassing, drowning; or an overdose of some kind of poison, such as morphine, alcohol, etc., except in some other cases under the
direction of a doctor. When a man has become unconscious from any of the above causes and is not breathing sufficiently to keep him alive, you should act quickly. Don't wait for help or to carry the man any distance, except to fresh air. Fold your coat or jumper and place it under the patient's abdomen just below the stomach. Open his mouth and clean out any loose substance that might be drawn into the windpipe, pull the tongue forward, place the patient's forehead on one wrist and extend the other arm upward from the body. Kneel straddle of the patient's thighs. Place your hands on the small of the back, two inches above the hips. Then swing forward, throwing your weight on the patient. Swing back again to upright position, keeping up this alternate pressure and release at the rate of sixteen times per minute until your patient revives, or at least two hours or more. If assistance is available you should have the patient kept warm by covering, hot water bottles, or any other means at hand, such as rubbing the limbs toward the heart to stimulate circulation.

A very good idea is for you to attend First Aid classes, if possible, and take the complete First Aid course, as it takes some practice in all of these things to reach the maximum proficiency.

UNDERGROUND FIRE PREVENTION

All employees are especially urged to be extremely careful regarding underground mine fires. Carelessness on your part in this respect is liable to hazard the lives of many men, the Company property, and to cause the stopping of operations for many days, throwing yourself and others out of employment.

Smoking is not prohibited underground, but all employees are urged to use extreme care in smoking, that no fire may be caused thereby. Do not smoke in dry, timbered places, where, if you dropped your cigarette or pipe, it would start a fire. Be sure your cigarette is absolutely dead before you throw it away.

Do not hang carbide lamps in such a position that the flame is directed towards timber. The heat of a carbide flame may kindle a fire several inches away from the end of the flame.

VENTILATION

Mine ventilation still remains one of the big problems in mining, both from a practical and technical standpoint. Especially is this true in our deep seated mines.
It is the desire of this department to make the best possible working conditions for the men employed. This calls for co-operation on the part of all connected with the mining industry.

Do not place any obstruction in the airways.

All employees are directed to familiarize themselves with the direction of the air currents in their section of the mine. If it is noticed that these air currents have changed, or stopped, you should be on guard for possible danger.

Please report any defects in ventilation doors to your Shift Boss at once.

**STENCH WARNING**

In case of emergency, it is necessary at times to call the crew from a mine. To handle this situation stench warnings have been introduced by many of the larger operators into the ventilation currents and the compressed air lines.

The stench most commonly used is "ETHYL MERCAPTON" which gives a strong odor resembling garlic. It is a general practice to place a bottle of this stench at one or more strategical points and have employees familiarize themselves with the odor and the operation of the warning system.

When this odor is observed, unless it has previously been announced as a test, all underground employees should:

- Leave their place of work at once in a quick and orderly manner;
- Give warning to all fellow workmen in their vicinity; and
- Go to the nearest safe exit.

**Note:** These instructions and rules to aid in prevention of accidents are used by the Hecla Mining Company, Burke, Idaho.

With a few exceptions (that are not applicable to each particular mining operation) the inspector of mines urges their adoption throughout the state, to fit in with the "Safety First" program of the mining department, in preventing avoidable accidents in the industry.
ACCIDENTS

During the past year, a definite effort was made to bring about safer working conditions in the mines, mills and smelters in Idaho. A SAFETY FIRST PROGRAM was inaugurated throughout the state to make the safety of men employed in the mining industry of paramount importance. In line of duty, the Inspector of Mines made many suggestions and recommendations to men and their employers, with a sincere hope the avoidable accidents would be cut to a minimum. Yet in number of fatal accidents, the year 1936 will no doubt be recorded as the most disastrous in the history of mining in this State.

The mining department regrets these facts exceedingly, and the inspector appeals to each individual for closer co-operation along safety lines, for the success of the department's program.

Most of the larger companies have, for many years maintained their own safety organizations. These organizations, in co-operation with the U. S. Bureau of Mines, give first aid training with instruction in mine rescue work to the men, and in general watch the workings for dangerous conditions, which are remedied as soon as possible. However, there is still room for considerable improvement, and before our program is successful, the inspector suggests that each individual be a safety first engineer within himself, thereby materially assisting in the improvement of working conditions pertaining to safety.

In the medium size and smaller properties, particularly where partnerships and lesors are working, or where old mines are being reopened, there is a definite need for closer supervision, and instruction in first aid and safety work.

It is a physical impossibility for any one man to carry out such a campaign all over the state and at the same time attend to the other duties of the office. To carry on this work in an intensive manner, a deputy inspector should be employed. This is provided for in the law but an appropriation has never been made for this purpose. This would enable the department to keep a continual check upon the work, instead of a brief visit once a year, which is all that is possible under present arrangements and with a territory to cover of approximately 83,888 square miles in area.

DESCRIPTION OF FATAL ACCIDENTS

February 7, Sunshine Mining Company; Sunshine Mine, Kellogg, Shoshone County, Idaho. Everett Wirta, married, shaft boss, age 46.

Everet Wirta was an experienced shaft man. Instead of spotting the cage while repairing a loose timber in the shaft on the 1300-foot level, Wirta entered the shaft while the skips or cages were moving. He evidently failed to hear the descending skip until it was a few feet above him. He tried to jump out onto the station but failed to reach safety. The skip hit the deceased nearly severing his head and inflicting other body injuries. Death was instantaneous.

Affidavits on file, signed by Robt. Beck, Lawrence H. Benton, and John Berg substantiate the foregoing statements.

February 8, Ed Hintz, prospector, Valley County, single, age 51.

State Mine Inspector,
Boise, Idaho.
Dear Sir:

Following is a report of a fatal accident that happened on or about Feb. 8, 1936.

Ed Hintz, single miner, age 51, working alone on his property in the Thunder Mountain mining district, was found dead by Gardner Sperry, on Feb. 10th.

Hintz had finished drilling and loading a round of seven holes, and had taken the tools to the portal of the tunnel, a distance of about 50 feet. He
ACCIDENTS

returned to spit the round when a fast running fuse fired one of the shots before he had all of them lit. He was found on his right side about 12 feet from the face with no muck under him. Five holes had fired. Two had not gone off or perhaps were never lit. A rock as large as a man's fist had entered his chest, killing him instantly.

No more work will be done in tunnel until after July 1st, so if you care to investigate the accident, let me know and I will see that things are not disturbed until that date. The fuses were about 4 feet long. Everything is left as it was found. The fuses of the unfired shots are still in place.

I am the victim's brother, and live at Stibnite, so if there is any more information you desire I would be glad to furnish it to the best of my ability.

Very truly yours,
Raymond Hintz.

April 11, St. Joseph Lead Company; Boise Rochester Mine, Atlanta, Elmore County, Idaho. Eric Miller, married, miner, age 54.

April 11, St. Joseph Lead Company; Boise Rochester Mine, Atlanta, Elmore County, Idaho. Charles Okerman, single, miner, age 57. Died the following day from crushed chest and broken leg.

Report on accident occurring between the hours of one and two o'clock A. M., April 11, 1936, in the number 3 ore pocket in the number 9 tunnel level in the mine owned and operated by the St. Joseph Lead Company, a corporation, at Atlanta, Elmore County, State of Idaho, by which accident Eric A. Miller was killed and Charles Okerman was seriously injured.

Being first duly deputized as deputy State Mine Inspector, by Arthur Campbell, State Mine Inspector of the State of Idaho, April 11, 1936, Mr. Campbell being unable to appear in person by reason of illness, I, GEO. M. WALES, the duly elected, qualified and acting Justice of the Peace, in and for Atlanta Precinct, Elmore County, State of Idaho, acting as Coroner by reason of the inability of the County Coroner of said Elmore County to be present, in pursuance of Section 3679 Idaho Compiled Statutes of 1919, DO HEREBY SUBMIT this my report on the above captioned accident based upon a personal examination at the scene of the accident as such deputy and upon evidence submitted by witnesses duly sworn in the matter of the Inquest personally conducted by me as such acting Coroner, held at 2:00 o'clock P. M., April 11, 1936, in Atlanta, Elmore County, State of Idaho, upon the body of Eric A. Miller, deceased.

I proceeded at once to the portal of number 9 tunnel where I was met by Mr. Leonard Yundt, assistant manager of the St. Joseph Lead Company, at Atlanta, Mr. Norman Smith, mine engineer and Mr. David Knooppi, employee on the night train crew operating from said number 3 ore pocket, Mr. Knooppi being the first man to appear at the scene of the accident, he having been on duty at the ore chutes of said pocket at the time of the accident. I entered the mine accompanied by Mr. Yundt, Mr. Smith and Mr. Knooppi, going direct to said pocket and up the manway on the west end of the pocket to the first inspection opening, which is ten feet above the floor or sill of pocket. From this opening I had a clear view of the interior of the pocket which I estimated to be ten to twelve feet wide north and south, eighteen to twenty feet long east and west and fifty feet high. Number 3 chute, through which ore is passed from number six tunnel level, opens into the pocket on the foot wall at the extreme upper east end of pocket. The upper portion of the pocket appeared to be well and substantially timbered. There were no timbers up through the center of the pocket from the sill to approximately twenty-five feet.

The ore dumped into pocket contains a heavy moisture content, therefore accumulates and packs on the walls and in the corners of the pocket to such an extent that the opening from the chute into the pocket in time closes up. It is then necessary to allow the pocket to fill and be cleaned out thoroughly by men working on top of the ore as it is gradually being drawn out through the chutes below. This cleaning out process had been started the
previous day, April 10th from the number 6 tunnel level where a substantial bulkhead had been placed.

Mr. Miller and Mr. Okerman came on duty at twelve o'clock midnight, April 10th, relieving Richard Keto, Ed Holbrook and Horace Godard, who at that hour had continued the cleaning of chute and pocket to within approximately fifteen feet of the sill of pocket, and according to testimony given at the inquest, the condition of the walls of pocket appeared to be in good shape and no indication of a slab on the walls could be seen.

Mr. Miller and Mr. Okerman carried the work on down to approximately the sill floor, at which time a slab was disclosed on the hanging wall, the north wall of the pocket, according to the evidence given by Dr. Frazier, while he was attending Mr. Okerman, "Mr. Okerman said that they were at the time examining and picking around it to see if it was safe or not when it fell." It was by the fall of this slab that Mr. Miller was killed and Mr. Okerman was seriously injured, estimated to be approximately 1:45 o'clock A. M., April 11th, 1936.

From my point of view at inspection opening, the outline on hanging wall distinctly shows the slab that fell was of a V shape, the point of the V being the approximate center of the wall with the opening of the V on the east end of pocket of approximately 3 feet wide, extending from sill up to approximately 20 to 25 feet. Mr. Knooppi, standing beside me, stated the upper part of the slab had come down since he had taken Mr. Okerman from out of the pocket and later the body of Mr. Miller, from which it is to be assumed only the lower portion of the slab fell causing the death of Mr. Miller and injury of Mr. Okerman.

Mr. Miller and Mr. Okerman are experienced miners having followed that profession for many years. To my personal knowledge they have been employed here in Atlanta by the St. Joseph Lead Company for the past four years.

The method by which the pocket was cleaned as hereinabove outlined, I commend as being practical and safe and by which a thorough examination can be made of the pocket as a whole. I therefore recommended that at such time in the future it again became necessary to clean the pocket, the same method be used under direct supervision of a competent official in charge.

Since the date of the above accident Charles Okerman died at St. Luke's Hospital in Boise, Idaho, on Sunday the 12th day of April, 1936 at 11:30 o'clock A. M.

Dated April 15th, 1936.

GEO. M. WALES,
Justice of the Peace in and for Atlanta
Precinct, Elmore County, State of Idaho,
as Deputy State Mine Inspector and as
acting Coroner.

April 28, Sunshine Consolidated Mining Company, Kellogg, Shoshone County, Idaho. Oscar Johnson, single, miner, age 56.

Johnson apparently committed suicide in an outbuilding of the property by blowing his head off with dynamite. It is reported the man had been drinking quite heavy and was rather despondent prior to the day this happened.


Wells Beck was an experienced miner who took a chance riding the bale of a skip up an incline winze as the crew were on their way home after finishing the shift.

Beck warned the other men to keep their heads down just before he raised his head and struck a roller in the winze, which resulted in fractured skull and other injuries, causing instant death.


Pierce had worked at this property in the capacity of mucker and timber-helper for about ten months. At the time of the accident he was removing
muck to make room for a set of timber. The muck was holding the walls and as it was removed a slab on the hanging wall fell. Pierce was knocked down and pinned to the muck pile, breaking his neck, causing instant death.

**July 13, Federal Mining and Smelting Company; Page Mine, Kellogg, Shoshone County, Idaho.** Andrew Leonard Johnson, married, crusheorman, age 59.

The accident occurred in the crusheer section of the Page Mine Mill at 10 P. M. The crusheer is a Blake type, having 52-inch six-spoke pulleys with 4½-inch faces on either side of the body of the crusheer. A feeding gate frees the mine ore through a short inclined steel hopper leading to the crusheer intake opening. While operating, the operator stands on a plank platform to one side to regulate flow of the mine ore feeding into crusheer by manipulating the gate and by the use of suitable steel hand bars provided to loosen mill feed.

There were no eye witnesses to the accident, and the hand bars were left standing as they are usually placed when not in use. Johnson had been employed on this same job for nearly ten years. The pulleys and belts had guards to protect workers passing this machine. The crusheer was running idle when deceased was found lying across its body between the pulleys. His skull was mangled and fractured.

In the circumstances and from the position the body was found in, any of the following situations may have caused the accident: (1) He leaned over from the feeding platform to examine or oil the crusheer and lost his balance because of a hand or foot slipping on or from support and effecting him to plunge forward over the body of the crusheer where his head struck against the spokes of the idling fly wheel (pulley) on the opposite side, or (2) After he had discontinued feeding the crusheer from his position on the platform he may have gone down to the floor below and facing the idling crusheer leaned forward over it or climbed upon its frame between the pulleys to examine or oil it and losing his balance from any cause fell into position causing his head to contact the pulley spokes, or (3) He may have fainted while he was examining or oiling from either the feeding platform or from the position he would be located in if working from off the floor below. At 59 years of age his heart may have played out. Johnson was a portly man weighing well over 200 pounds.


Kendrick was spotting cars for partner to load. He was probably looking back at his partner and forgot the chute lip ahead of the motor. His head was crushed and fractured when caught between chute lip and motor. Death was instantaneous.

Robert Hunter, being duly sworn, says: That I am an underground motorman employed by the Bunker Hill & Sullivan Mining & Concentrating Co. at Kellogg, Idaho. That on the 13th day of July, 1936, I was operating a storage battery locomotive hauling ore cars on the No. 21 level of the Bunker Hill mine and that during the afternoon of the said day I requested of the Mine Foreman someone to assist me in spotting and loading the ore cars; that about 3:00 P. M. of the said day I moved the ore train to spot one of the ore cars under one of the chute lips on the said level for the purpose of loading the car; while loading the car with ore from the chute Joe Kendrick, known to me to be an employee of the Bunker Hill Mine, approached the train through the tunnel saying that he had been sent to help me. At the time I was standing by the car loading it from the chute and Kendrick climbed on the motor to operate it and move the train forward for the purpose of spotting another car for loading. Before he moved the train I said to him, "Watch out for that chute lip," meaning the chute lip just ahead of the motor; he replied, "Yes, I will watch it." He then moved the train for-
### CLASSIFICATION OF ACCIDENTS

<table>
<thead>
<tr>
<th>MINE</th>
<th>Fatal</th>
<th>Seriously Injured</th>
<th>Slightly Injured</th>
<th>Time lost over 14 days</th>
<th>Time lost 7 to 14 days</th>
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<tbody>
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<td>UNDERGROUND</td>
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<td>3</td>
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<td>3</td>
<td>1</td>
<td>19</td>
<td>69 50</td>
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<tr>
<td>2. Rock or wall while loading at working face or chute</td>
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<td>1</td>
<td>13</td>
<td>19 14</td>
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<tr>
<td>3. Timber</td>
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<td>7</td>
<td>1</td>
<td>13</td>
<td>19 14</td>
</tr>
<tr>
<td>4. Explosives</td>
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<td>7</td>
<td>1</td>
<td>13</td>
<td>19 14</td>
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<tr>
<td>5. Haulage, cars or motors</td>
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<td>6. Persons falling down chute, winze, raise or stopes</td>
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<td>1</td>
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<td>19 14</td>
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<td>7. Drilling (by machine or hand drills)</td>
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<td>7</td>
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<td>13</td>
<td>19 14</td>
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<td>8. Hand tools</td>
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<td>7</td>
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<td>13</td>
<td>19 14</td>
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<td>7</td>
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<td>13</td>
<td>19 14</td>
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<tr>
<td>10. Flying or falling objects</td>
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<td>7</td>
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<td>19 14</td>
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<td>11. Fall of persons</td>
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<td>1</td>
<td>13</td>
<td>19 14</td>
</tr>
<tr>
<td>12. Lifting</td>
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<td>19 14</td>
</tr>
<tr>
<td>13. Nails and splinters</td>
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<td>7</td>
<td>1</td>
<td>13</td>
<td>19 14</td>
</tr>
<tr>
<td>14. Electricity</td>
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<td>19 14</td>
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<td>15. Other Causes</td>
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<td>19 14</td>
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<td><strong>17</strong></td>
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<th>Slightly Injured</th>
<th>Time lost over 14 days</th>
<th>Time lost 7 to 14 days</th>
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</thead>
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<td>3. Crushers, rolls or stamps</td>
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<td>4. Tables, jigs, etc</td>
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<td>6. Falls of persons</td>
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<td>7. Falls in ore bins</td>
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<td>8. Falling objects, rocks, timbers</td>
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<td>9. Scalding (steam, water or acid)</td>
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<td>11. Hand tools, axes, bars, etc</td>
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<td>12. Nails, splinters, etc</td>
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 SHAFT ACCIDENTS

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<td>Breaking of cables</td>
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SURFACE ACCIDENTS

Yards, shops and construction

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<tbody>
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<td>Mine cars or mine locomotives, gravity or aerial trams</td>
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<tr>
<td>Flying and falling objects</td>
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<tr>
<td>Lifting</td>
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<tr>
<td>Nails and splinters</td>
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<td></td>
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</tr>
<tr>
<td>Hand tools, bars, axes, etc.</td>
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<tr>
<td>Falls or run of ore in or from bin</td>
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<td>Timber, open pits and other causes</td>
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Grand Total                                          27 | 19 | 391 | 371 |

SMELTER ACCIDENTS

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<th>20</th>
<th>21</th>
<th>22</th>
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<td>Haulage (cars, motors, etc.)</td>
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<tr>
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<td>Cranes</td>
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<tr>
<td>Falls of persons</td>
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<tr>
<td>Flying or falling objects</td>
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<tr>
<td>(rocks, timbers, etc.)</td>
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<td>Hand tools, axes, bars, etc.</td>
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<tr>
<td>Burns from matte, slag or molten metal</td>
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<td>Other causes</td>
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AUXILIARY WORKS

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<tr>
<td>Nails and splinters</td>
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<td></td>
</tr>
<tr>
<td>Hand tools, axes, bars, etc.</td>
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<td>Handling hot materials</td>
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<td>Electricity and other causes</td>
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</tbody>
</table>

Grand Total                                          3  | 3  | 47 | 33 |

*Note: August 22, 1936; Smith Mountain Mill; Placer Basin, Adams County, Idaho. John Emsley Glenn, age 58, single, woodsman. At the time of his death, deceased was engaged in clearing a right-of-way for a pipe line serving both the Smith Mountain Mill and Placer Basin company's mines. His death resulted from a falling tree which caught in a standing tree, throwing back the top of the falling tree, striking the deceased in the head and resulting in instant death. (The information concerning this fatality received too late for detailed classification.)
ward but did not watch the chute lip apparently as it caught him on the side of the head rolling his head over on the top of the motor killing him.

ROBERT HUNTER.

Subscribed and sworn to before me this 14th day of July, 1936.

W. A. TUSON,
Notary Public.


Matson had been employed by this company for twenty years. At the time of the accident deceased was placing a set of timber, and had just lagged over the set with sawed and cedar lagging. About 300 pounds came loose, broke the lagging and caught Matson on head and shoulders. His skull was fractured.

If the set had been cribbed this accident would not have been serious.

M. T. Williams and Tony Valentine said the sawed lagging showed defects, as there were large knots at the point of breaking.


Grover Davis, miner, married, age 48.

These two accidents occurred in the big stope above the main level at the North Star Mine.

A large slab of rock came down from the hanging wall without warning and as it hit broke in two pieces, one striking Downing and the other piece striking Davis, killing both men. The slab fell about 9:30 P. M.

The men working in the stope had been cautioned not to pass under or work near this slab of rock. Preparations were under way to plug and blast down the slab at the time the accident happened.

Three men subscribed and sworn before J. E. Hedrick, Notary Public, Hailey, Idaho, made statements as follows:

James Ivie, being first duly sworn, deposes and says, we went in there that evening and barred down all the loose rock, except the slab which we did not bother. We warned everybody not to go in there. Then Jack, the shift boss came in, looked it over and told everyone to stay away from there. We went ahead and set up our machines and the muckers went over on the north end of the stope. We set our machines up on the south end of the stope.

We were just getting our machines ready and were going after steel when Grover Davis came in with some steel and the slab came down.

JAMES IVIE.

Jack B. Zilkey, being first duly sworn, deposes and says, I first entered the stope about twenty minutes after nine, and as usual I make a thorough inspection of all the working places where men are at work. Finding that the miners had barred down it would be safe. Then with a more thorough examination, I decided to move all the shovelers away from this certain locality. I decided to shoot all the ore down up to the solid hanging. I then advised all men in the stope to stay away from this certain place. These two men were working in this place, contrary to orders. I was in the big stope about fifteen minutes or longer. I immediately went down to the Plummer Tunnel and back to the transfer chute. Almost immediately I heard the accident signal on the air pipe. On returning to the big stope I found two men seriously injured, and they were in a place they had been told to keep away from.

J. B. ZILKEY.

Robert Houston, being first duly sworn, deposes and says, We barred down the loose rock to make the stope as safe as possible. At the time Jack Zilkey, the shift boss came in, we tested it in every way we knew for safety. Finally the shift boss decided to move the shovelers into as safe a place as possible. Insofar as it was possible to tell, it was safe enough to
drill the slab down, and we set up the machines to drill and blast the slab down to make it safe. In my opinion, the cave-in could not have been foreseen. There was no way of telling.

ROBERT HOUSTON.

The inspector of mines was notified of these accidents, while in Bonners Ferry, Boundary County, Idaho, at 10 A.M. the following morning. By car and airplane for transportation it was made possible for him to be on the scene, and make an investigation that same evening. It was found that the foregoing statements are correct. The inspector made suggestions and recommendations to jump in stulls with headboards at certain intervals and to leave pillars of ground in place to help hold the back until stope is finished. At such time these pillars could be salvaged when the stopes are abandoned with a very slight loss in tonnage, and prove a much safer method of mining.

October 5, Sunshine Mining Company; Sunshine Mine, Kellogg, Shoshone County, Idaho. Melvin J. Barton, shaftman, married, age 26.

This accident occurred at the 1900-foot level of the new four-compartment vertical shaft of the Sunshine Mine at 2:30 A.M. October 5, 1936.

At a coroner's inquisition, held in the district courtroom, Shoshone County courthouse, October 7, it was brought out in the evidence that an average of ten men worked in the bottom of this shaft on each shift, making a total of 30 man shifts every 24 hours and 900 man shifts a month. In sinking over 2000 feet this is the only fatal accident that occurred during a period covering a full year.

The men barred down, before they started to muck and considered the walls to be safe enough to proceed.

The slab that fell out of the wall, was wedge shaped. It fitted into the wall like a wedge, small at the top and large at the bottom. This particular slab was sounded but did not sound drummy and was considered safe enough. Two slick slips or fractures were noticeable after the rock fell but not during the process of barring down.

The muck pile was about 15 or 16 feet below timber and some of the men thought another set of timber should have been hung before the muck was removed. However the "lead man" or "jigger boss" figured it was safe enough to start mucking and let the following shift put in two sets of timbers. This was the plan and orders left by the shaft foreman, but if these men on that shift had sensed the danger existing timber would have gone in regardless of orders, as matters of immediate judgment were left up to the "pusher" on shift and he had the right to use his own initiative. Generally it is good policy to go into a huddle with the rest of the crew on matters of this kind before a man in charge decides on any particular plan of action.

Barton came to the district from Wyoming. He was an experienced shaftman and had worked in the Sunshine shaft about six months. The deceased was buried by about three feet of muck when the chunk fell out of the wall. His chest was crushed with probable internal injuries. Death was instantaneous. The slab which fell was large enough to have caught more men if one corner had not rested on the muck pile. Ten men in a rough bottom at one time appears to be a crew large enough to get in each other's way, and it was possible for this slab to have caught three or four men in place of one.

October 6, Federal Mining & Smelting Company, Morning Mine, Mullan, Shoshone County, Idaho.

Elmer Woodworth, timberman, single, age 46.
August Simonene, shoveler, married, age 46.
Cleo Purcell, shoveler, married, age 28.
Rex Micheletta, timber-helper, single, age 28.
Harry McGowan, timber-helper, married, age 37.
Louis A. Goff, timberman, single, age 25.
William R. Buchanan, timber-helper, single, age 23.
Jerry Phelan, timberman, married, age 28.
Carl Donaldson, timberman, married, age 24.
Andrew Kese, timber-helper, single, age 54.
This terrible tragedy is the greatest mine disaster the State of Idaho has experienced in its 75 years of mining, when mineral was first discovered at Pierce City, in 1861, and in the 50 years of mining history in the Coeur d'Alene district.

As the last cage load of men was being hoisted at the finish of the night shift for the working day of October 5, 1936, the cable in the "chippy" compartment parted at 12:10 A. M. on the morning of October 6, 1936, causing the death of ten men, in a drop from the 3050 level, 900 feet to the bulkhead below.

Woodworth, Michellleta, McGowan, Buchanan, Donaldson and Kese were loaded on the bottom deck of the "chippy" cage by Henry Aunes, the shaftman who was in charge of hoisting the shift on the two-deck "chippy" cage. Aunes rode up to the 3050 level where he loaded Simonene, Purcell, Goff and Phelan with the other six men he had loaded on the 3250 level. Closing the cage doors, Aunes then gave the hoistman (two bells) a signal to lower and spot the top deck for loading. As the eager was opening the doors the cable broke some 1300 feet higher up the shaft and the cage started its wild ride down the shaft to the bulkhead, a distance of about 900 feet.

The heavy cable followed the cage down the shaft and added to the destruction wrought by the crash of the cage on the bulkhead.

The men were badly mangled in the crash, their bodies being difficult to identify. The cage and cable had to be taken out in sections by burning with an acetylene torch. Guide timbers and muck also added to the difficult task of finding and removing bodies of the deceased.

The mine inspector arrived on the scene, twelve hours after the accident to take immediate charge and conduct an investigation. Nine bodies had already been removed, with one man still missing. The body identified as that of Louis Goff was found on top of the bonnet of the cage under 1300 feet of cable and other debris.

A coroner's inquisition was held in the district courtroom at the Shoshone County Courthouse before a jury of six men who, after deliberating, brought in a verdict at 12:05 o'clock on the afternoon of October 7, 1936, finding the accident unavoidable.

The jury's verdict reads:

"In the matter of the inquisition of the accident occurring at the Morning Mine on October 6, 1936:
"We, the undersigned jurymen, called to investigate and decide as to the type of accident which occurred on this date, do decide that it was an unavoidable accident.
"All of which we duly certify in writing by us signed this 7th day of October, 1936."

Paul H. Batzle,
S. H. Fairweather,
M. J. Morbeck,
J. H. Foss,
William Mullen,
J. W. Osborne.

The inquisition was conducted by Herbert C. Mowery, Shoshone County Coroner and State Mine Inspector, Arthur Campbell. The following witnesses were called:

Con Johnson, Morning Mine pumpman, in charge of underground mechanics; J. E. Berg, general superintendent, Federal Mining & Smelting Company; James H. Pratt, head rope man; Leslie Fisher, assistant mine foreman, in immediate charge of underground work on shift when accident happened; Axel Berglund, hoistman on duty when the cage fell; Henry Aunes, shaftman, eager on duty at time of accident; Earl Manier, shift boss on the 3050 level; C. L. Burch, shift boss on the 3250 level; Axel E. Johnson, engineer in charge of the mine safety department; Oscar Wolford, miner on 3050 level; W. G. Washburn, general manager of the Federal Mining & Smelting Company.

In the testimony presented it was found the cage was equipped with standard safety devices that were gone over daily by mechanics. The cables
were inspected by the rope men at weekly intervals, who did not detect any flaws at the last inspection nor had anyone reported noticing anything unusual up to the time of the accident. No definite time record was set for the life of a cable. It depended upon general developments and conditions. Average life of cable about one year. This particular cable was put on January 17, 1936, and had been in use about eight months.

A safety first program was in effect at the Morning Mine and orders had been given to load only 8 men on the lower deck of a cage and 7 men on the top deck. A miner testified that he would have crowded onto the cage if the cages had permitted him to do so, and hadn't closed the door. That the cable, a flat type ½-inch thick and 4 ½ inches wide, had a "breaking strength" of approximately 72.8 tons and that the capacity load in hoisting or lowering materials was 18,373 pounds when the cage was loaded at the bottom of the shaft. The estimated load when the cage fell was 11,709 pounds, including 2300 feet of cable strung out to the 3050 level. The cable weighed approximately 6509 pounds, while the cage weighed 3600 pounds and the ten men inside about 1600 pounds. This load would give a margin of safety when the cable parted of 12 to 1. With a capacity load at the bottom of the shaft a margin of safety of 8 to 1 when a fair margin for running ropes of 5 to 1 is considered reasonably safe. That the company carries on a safety program, practice safety at all times, and that 10 feet from the break the cable had been cut so that an inspection could be made by cable experts to determine what caused the break.

In the past two months the Federal company have inaugurated a check in and check out system by number; require the shift bosses to remain on the stations to check their men when coming off shift; have two men on the deck of engines when hoisting or lowering the shift; have installed different types of safety devices that do not depend entirely on the dogs biting into the guides to hold the cage in case of an emergency; insist that not more than 15 men are loaded on a cage with no crowding; intend to change the cables used as running ropes at shorter intervals and many other improvements along safety lines.

The company is to be congratulated for the co-operation with the state mining department on safety measures suggested and recommended by the inspector of mines.


Bates was working in an open pit for Roy Lilya. At the time of the accident he was shoveling. At 11:00 A.M. about 150 pounds of muck broke loose from the side of the pit and hit Bates, knocking him down. With a fractured hip and chest injuries Bates was moved to the General Hospital, Salmon, where he died November 9, 1936.

December 3, Prospect near Liberty Mine, Sweet, Gem County, Idaho. Murl Seetin, homesteader and prospector, age 53.

Seetin had some property near the Liberty Mine about five miles above Sweet. The body was found by friends from the Liberty who reported that the deceased was accidentally killed while working alone on his claims by falling rock. The body was taken to Emmett.

December 6, Sunshine Mining Company, Sunshine Mine, Shoshone County, Idaho. Tony Frank, mucking machine operator, single, age 21.

Tony Frank was operating a mucking machine on the 2200 intermediate drift of the Sunshine Mine at the time of the accident.

Stringers, ten feet long were placed ahead and lagged over with pole lagging from hanging to foot. The ends of the stringers were supported by a sprag pole, blocked against the walls.

A slab of rock fell from the back with sufficient force and weight to break the sprag, which let the stringers and other timber down on the operator and his machine.

Frank was driven head first against the valves of the mucking machine and it is believed that the shovel on the upward swing caught him full in
the face causing basal skull fracture, hemorrhage into both eyeballs, fracture into accessory nasal sinuses, and sup. maxilla.

The deceased was first taken to the Wallace Hospital, then to the Deaconess Hospital, in Spokane, Washington under the care of a specialist, where he died, December 8, 1936.

W. R. Barber and W. H. Sanders witnessed the accident as they were waiting to put the helper posts under the stringers as soon as sufficient muck was removed.


There were no witnesses to this accident. The presumption is that Strode while fighting ice, slipped and fell through door, striking his head on scow that was tied alongside, causing unconsciousness. Strode was drowned in dredge pond.

The deceased’s body was found by Frank Gallagher, foreman, and C. E. Edwards, winchman. From those who knew Ernest Strode no information was given that would lead one to believe there was an incentive for suicide. He had been employed by the Idaho Gold Dredging Company for three years, was a happy family man and had just purchased a new home.


At the time of the accident Masoner was helping Lester Howard, miner, bar down a face of ore, on the second floor in 1117 stope on the 1100 level preparatory to drilling a round of holes. A boulder weighing about 700 pounds fell out of face and went through flooring. Masoner fell through at the same time and was apparently struck by this rock and pinned against a post on the sill floor.

An ambulance from Boise arrived some hours after the accident and the injured man was moved to St. Luke’s Hospital, Boise where he died some 14 hours after the accident of ruptured spleen and other internal injuries.

The inspector of mines recommended better and more immediate medical attention for injured workmen. The operators in the vicinity of Quartzburg and Placerville could well afford to furnish a community ambulance or like means of conveyance to serve the district in cases of emergency.


At 10:25 A. M. on the day of the accident, Edward Small, Morris Ogilvie and William King were engaged in putting tar paper and sheeting on boiler room roof, at the site of the new Polaris mill, near Osburn. While fellow workers were moving a ladder, King was sitting on crown of building, when some paper under him slipped, allowing him to slide down the roof to the ground which was about 35 feet below, causing fracture of the skull, both arms, right leg, jaw and numerous ribs.

Statements of witnesses who saw the accident are as follows:

When I saw King last, he was up on the roof on ladder. This is approximately 10:20 A. M. I went into the office and within five minutes Linn came in and told me King had fallen off the Dry Roof. The office is situated approximately 150 feet from the mill. When I arrived at the scene, Schiedeman was administering artificial respiration, with King lying upon his face. He was bleeding at the mouth. Within five minutes or so we started him to the providence Hospital.

G. D. LUCAS, Foreman.

About 10:15 on the morning of December 24, 1936, William King and I were working on the roof of the boiler building. I started to move a “chicken ladder.” When he saw I was going to move it, he moved over to get out of my way, and he sat down on the roofing paper we had stretched out. He slid with the paper and dropped off to the ground—a vertical distance of, I should say, thirty feet.

ED SMALL.

Note: A “chicken ladder” is a board with cleats, used in roof construction as a footing for the workmen.
William M. King was on the crown of the building, helping to lay the roof. He moved back onto the tar paper, while Tharp, Small and myself were moving the ladder. While we were moving the ladders King slid off with the tar paper, falling to the ground, which was about 30 or 35 feet below. This was at approximately 10:20 A. M.

I was working on the scaffold when I noticed this man come sliding down the roof. I was slightly to one side of the path of his fall, but was unable to reach him. The time of this accident was about 10:20 A. M. We were putting tar paper and tin over the board roof at the time. The tar paper had been laid, and this man King moved over when we were about to move the ladder. When he moved onto the tar paper, it gave way, causing him to lose his purchase on the roof and causing him to slide.

LLOYD THARP.

Think Safety and Work Safely.
Safety First at All Times.

The Meaning of Safety
Closing Paragraph of a Speech by Mr. J. Dewey Dorsett, Chairman N. C. Industrial Commission.

Now, Mr. Average Employee, let us see what safety means to you. "Believe it or not," safety concerns you more than it does anyone else. If you are ever inclined to doubt the worth of all the safety effort going on around you, stop and do a little straight thinking. You bet your life when you take a chance, and if you are a chance taker, the law of probabilities will get you in the end. It's inevitable. You all know that the prevention of accidents is much better than the cure of injuries. I don't need to tell you that it pays to be careful. Nor do I need to tell you that safety is not all one-sided. You know that it is not merely a company scheme to save money, for you know that it is the injured man who is always the big loser. Safety concerns you more than it does anyone else. While accidents cost the company money, they cost the injured man what money cannot buy. When a man gets hurt, the company can pay him the compensation the law provides and they can continue to operate their business and recover their loss. But the injured man—what about him? What part, if any, can he recover? Man is given only one life on earth. When that is snuffed out, he is through. He is given but one body and when he loses any part of it, it is gone for good. There are no spare parts. An eye, an arm, or a leg can only cost the company so much—they pay the bill and forget it; but it keeps on costing the victim as long as he lives. He cannot forget it; he pays and pays and pays. Expense resulting from accidents is money wasted, it's dead loss. I have never seen a dollar spent as the result of an accident where everybody concerned would not have been better off were it not necessary to spend that dollar. An accident compensated for is but an apology; an accident prevented is a benefaction.

I am sure you all realize that safety is only possible when every man makes an honest, sincere effort to be careful, to use safety appliances, to report or correct hazards where noticed, to get first aid immediately even for the slightest scratch, in order to avoid infection, and to ask yourself every day, "Am I a safe worker?" "Am I an asset or a liability to my employer?" Every worker has his individual responsibility regardless of what the other fellow does. Safety is a habit. Get it. It is a mental habit, a state of safety consciousness, a sort of "built in" safety. Some men are born with it, some acquire it, and many an unfortunate fellow has learned too late that it is "Hell" to be a cripple.
The Idaho Gem Club

By JOHN T. CARPENTER

The Idaho Gem Club was organized in May, 1935, and has grown steadily since with members in every part of the state as well as several in other states. A chapter of the club has been formed at Orofino, Idaho, and is growing rapidly. The Mineralogical Society of the Coeur d'Alenes, organized during the past year, while not an integral part of the Idaho Gem Club has the same interests and purposes.

This increasing interest as evidenced by the growth of these organizations indicates an increasing consciousness of the people of the State to its great and varied mineral wealth. Many areas throughout the State offer to the collector of gems and minerals a variety of material not to be surpassed in any other locality.

The deserts of Owyhee County yield agates of nearly every type and description including some of the most beautiful scenic agates found anywhere, jasper in red, yellow, and green tints, some of which are of the mossy variety, and precious fire opal.

Silicified, agatized, and opalized woods of great beauty are found in many parts of the State. Much of this material is exceptionally fine for the making of book ends, ash trays, or paper weights.

Large fossil leaves of various species may be found in the great thicknesses of the sedimentary Latah formation in northern Idaho, while the corresponding Payette formation of southern Idaho yields, among other things, fossilized fish skeletons, leaves, and pine cones. Fossilized remains of Plesippus, a relative of the three-toed horse, Eohippus, are found in the great fossil beds near Hagerman, Idaho.

From central Idaho comes one of the rarer zeolites, Mordenite. This mineral seems to be present in greater abundance, and in better specimens here than at any other known locality.

Beautiful sapphires, a few rubies, and many garnets of various colors are found in the central, northern, and western sections. Some of the sapphires and garnets show asterism.

Cutting and polishing of this material is now being done by several members of the club who have installed the necessary equipment. A display case containing this cut and polished material as well as many beautiful rough specimens is now located in the rotunda of the State House at Boise.

Collecting these stones makes not only an interesting and educational hobby but may prove to be remunerative as well, as many of these stones are in demand by private collectors, and museums. Some of the better stones such as smoky quartz crystals, best grade, are quoted at about $2.00 an ounce. Amethystine quartz crystals of the best grade bring about $2.00 per carat. Optical companies are in the market for clear calcite crystals, known as Iceland spar.

Interest in the earth sciences in the elementary schools of Boise is being fostered by Howard Rice, principal of the Longfellow School. Last year Mr. Rice, a member of the club, conducted a contest among his pupils for the best collection of minerals and gem stones. A marked interest was shown by the children in this contest, and a number of remarkably fine collections were gathered. This interest continued throughout the summer and another contest will be held this year. The prizes, consisting of several cut and polished stones were donated by the Idaho Gem Club.

The club is endeavoring to make brief maps of all localities in which interesting and valuable material may be found. These maps, when completed, will be on file with the club secretary.

An educational program has been evolved for the ensuing year in which the members of the club will study several subjects related to gemology. These studies will be undertaken during the winter months when the collecting of material is impossible, and will include the geology of gem deposits.

The present officers of the Idaho Gem Club are: John T. Carpenter, president, 1219 N. 8th Street, Boise; Milton J. Thurber, vice-president, 1610 N. 11th Street, Boise; Harry D. Eslick, secretary, 602 Washington St., Boise; Art V. Farrell, treasurer, Route 4, Boise.
In the United States the outstanding feature as regards zinc in the year 1936 has been the improvement in price accompanied by better demand occasioned by the improved economic condition of the country. No outstanding advancement in metallurgy has been seen. In recent months attention has been drawn to the way in which the production of high grade zinc has expanded in the world beginning in the last twenty years or so, and more especially in the last few years. World production statistics emphasize the big rise in the proportion of electrolytic zinc to the total output although a part of the increased high grade production has been by the vertical retort smelting and re-distillation process.

For several decades zinc metallurgy was a stabilized procedure producing “spelter” by means of the retort distillation process. “Spelter” has been for many years the trade name for zinc. It is still all too frequently used although in recent years the term “spelter” has come to mean only the impure alloy of zinc as produced by the old-time retort distillation process, contaminated with as much as 1.6% lead, cadmium frequently in excess of .5%, .08% iron, and other impurities not specified.

By this method of retort distillation smelting and the use of pure zinc ores and concentrates, comparatively free from the foregoing contaminating elements, there was and still is produced, a higher grade zinc metal. However, the introduction of the electrolytic process in commercial production during the World War was largely responsible for the increased production of “High Grade” zinc.

The following classification for zinc by the American Society for Testing Materials has been adopted by many users of zinc, including all of the important consumers, but unfortunately the classification is but little known elsewhere, even among the mining fraternity and as a result “high grade” zinc is considered by the world at large as being the purest form of the commercial metal, whereas, as can be seen by the classification, this distinction should be reserved for “Special High Grade”—99.99 plus % zinc.

<table>
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<th>Type</th>
<th>Lead (max., per cent.)</th>
<th>Iron (max., per cent.)</th>
<th>Cadmium (max., per cent.)</th>
<th>Alumimum (max., per cent.)</th>
<th>Sum of Pb, Fe, Cd (max., per cent.)</th>
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<tr>
<td>(1a) Special High Grade</td>
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<td>0.005</td>
<td>0.005</td>
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<td>0.010</td>
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<tr>
<td>(1) High Grade</td>
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<tr>
<td>(2) Intermediate</td>
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<td>0.03</td>
<td>0.50</td>
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<tr>
<td>(3) Brass Special</td>
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<tr>
<td>(4) Selected</td>
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<td>0.04</td>
<td>0.75</td>
<td>None</td>
<td>1.25</td>
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<tr>
<td>(5) Prime Western</td>
<td>1.60</td>
<td>0.08</td>
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</table>

This fact has a particular interest for Idaho because “Bunker Hill” Brand zinc, production of which in the electrolytic zinc plant of the Sullivan Mining Company, at Silver King, Idaho, commenced in the late fall of 1928, was the first 99.99 plus per cent grade of zinc to be produced commercially. It met the urgent need of the zinc base die casting industry for zinc metal with less of the impurities which had proven detrimental in that art. It is not too much to say that it came as a necessity. Research and experience had proven the harmful effects of these impurities and the use of the pure zinc metal was largely instrumental in effecting the necessary improvements in the strength and stability of present day zinc die casting alloys.

In the intervening period since 1928 the efforts of the Sullivan Mining Company have been directed toward the further refining of “Bunker Hill” zinc and the product has been increased in purity until it is approaching, although it has not yet consistently reached, 99.999% grade.

In this short review it is impossible to recount fully the particular technical details of the electrolytic zinc process which concern the production of
special high grade metal. The achievement of this degree of purity involves careful control of each step of the process, from the preliminary roasting of the zinc concentrates to the final electrolysis of the purified zinc sulphate solution. It is the result of numerous researches, of experimental methods of departmental operation, leading to improvement in mechanical equipment and in the routine of plant operation. When the objective is the further refinement in purity of product to one or two units in the third decimal place, it is not reached so much by radical changes in plant operation as by improvement in details, each minor perhaps in itself, but in summation attaining the desired result. This, at any rate, has been the method by which the Sullivan Mining Company has achieved the continuous improvement of its zinc product until it is approaching 99.999% quality, and because there is need for a zinc of this degree of purity our aspiration toward this ultimate goal is our first and most persistent concern.

This special high grade zinc, a relative newcomer among the metals, possesses greater strength, ductility, malleability, resistance to corrosion attack, and permanence than less pure zinc hitherto available. In its pure state this grade of zinc is now being used for galvanizing iron in the form of sheet and principally iron wire to insure long life. Such galvanized iron wire is now being used for telephone wire and for the wire forming the cables of suspension bridges such as those in San Francisco Bay as well as those that have recently been built in the vicinity of New York City.

Alloyed with smaller amounts of other metal, this zinc, however, has found its greatest outlet in zinc-base die casting alloys. The term die casting generally refers to a casting that has been made in a metallic mould or die, into which molten metal has been forced by the application of pressure. The process of die casting consists essentially of melting the die casting alloy in a suitable container and forcing it, under pressure, into metallic moulds or dies, allowing it to cool in them, and then opening the dies and removing the castings, thereby producing smooth, finished castings which require little or no machining. The method is best adapted, in quantity, to small and medium sized parts where accuracy and uniformity are essential. The die casting, frequently a most intricate design, is complete when it comes from the mould except perhaps for a simple cleaning operation. The use of die casting perfects a great saving in time and labor cost, in machine equipment, fixtures and tools of various kinds.

Alloys have been developed for the die casting process which possess strength, ductility and resistance to shock to such an extent that they approach mild steel in their characteristics; and alloys are now being cast that formerly were considered impossible to handle by this process.

It would be presumptuous to assume that the fast development of the zinc die casting industry is wholly caused by the production Bunker Hill brand of special high grade zinc. It was, however, undoubtedly a large factor in the chain. Through the instrumentality of the American Society for Testing Materials, which has a sub-committee engaged in a study of zinc base die casting alloys, it became possible to have tested some of the zinc-base alloys made up of Bunker Hill pure zinc in place of the less pure zinc formerly used. By this means the development of reliable zinc-base alloys was pioneered because the results of these tests were outstanding demonstrations of the need for very pure zinc in these types of alloys.

The use of zinc-base die casting alloys has gone rapidly forward from this date. It has grown even during the years of the depression. Last year, 1935, which is the last year for which statistics are now available, approximately one ton out of every ten tons of zinc produced in the United States went into the zinc-base die casting alloy field. A never-ending parade of products utilizing zinc alloy die casting has been produced by the alert product designer, engineer or manufacturing executive. Since the discovery of strong, stable zinc die casting alloys, the die casters, with renewed confidence in their materials, have pioneered in the fields of new application and new industry.
One of the first industries to use zinc alloy die castings in any considerable quantity was the automotive industry. Here they have constantly taken advantage of widening design possibilities. Structural parts such as windshield frames, radiator grills, lamp and spare tire brackets, carburetors, fuel pumps, clutch controls, are now made of zinc-base alloys. Machine parts are using this material in increasing amounts, in parts of valves, journal bearings, lubricating parts, pipe fittings, motor and gear housings, pulleys, etc. Office and store equipment find a field for its use in such things as telephone bases, typewriter frames and carriages, check protectors, calculating machines, etc.

In the household appliances there is a large field. The trim handles, knobs and mouldings for stoves and refrigerators are die casting alloys. Kitchen mixers, lamps, fans, vacuum cleaners, washing machines, wringers utilize zinc-base die casting alloys. Clocks and novelties, candlesticks, shears, bathroom fixtures, locks and hardware find an ever-increasing field for zinc-base die casting alloys.

In a recent symposium discussing the role of metals in transportation C. H. Mathewson, Professor of Metallurgy, Yale University, New Haven, Conn., has the following to say: "Zinc-base die casting alloys are now so familiar in comparatively large units that there is speculation concerning their use for such important parts as the automobile turret top. With regard to this material, which is relatively inexpensive, casts to easily and possesses strength and stiffness almost within the range of the ordinary stress-carrying materials of construction, it may be difficult to restrain over-emphasis and unreasoned application to every part that looks in any way eligible. Fortunately, however, the casting of locomotive bodies of zinc-base alloys is practiced only by the manufacturer of toys."
Purpose, Problems, and Accomplishments of the Idaho Bureau of Mines and Geology

MOSCOW, IDAHO

By A. W. FAHRENWALD, Director

Board of Control: Honorable C. Ben Ross, Governor of Idaho, Chairman; Arthur Campbell, Inspector of Mines; Stanly A. Easton, President of the Idaho Mining Association; F. B. Laney of the School of Mines faculty, University of Idaho; A. W. Fahrenwald, Dean of the School of Mines, Director, and Secretary of the Board of Control.

Since this bureau publishes only technical reports of investigations and no annual report of its activities, the Inspector of Mines has kindly invited the director of the bureau to outline its purposes and projects for inclusion in his annual report upon the mining industry of Idaho. The bureau's duties are distinct from those of the Inspector of Mines, but both serve the mining industry and work in close and cordial cooperation.

The bureau was established by act of legislature in 1919 to investigate, under the Board of Control, the technical aspects of the mineral resources of the state, mining, metallurgical, and geological problems, do topographic and geologic mapping, hydrographic surveys, and publish reports. The legislature in 1933 amended the original act so that the bureau is now authorized to carry on necessary technical studies and cooperate in the investigations for which it was created with any federal or state department or bureau, in order to accomplish increased results at a minimum cost.

There are large unmapped areas in Idaho that are highly promising for valuable mineral deposits. The method of the bureau is to carry on systematic scientific field and laboratory studies of these areas. Results of this work have led to economic operations in numerous places in Idaho. Bulletins and papers are published each year as funds permit.

GEOLOGICAL STUDIES

Cooperative work with the U. S. Geological Survey is being continued on as large a scale as funds appropriated by the legislature will permit. Because of the better economic conditions surrounding gold and the wide scattered interest and location of gold districts in Idaho, cooperative geologic field studies have been designed to aid and encourage the finding and production of this metal. Placer and lode gold mining is in much evidence in scales of operation ranging from one-man sluicing and panning operations to huge dredges and modern flotation and cyanide plants. Old districts are well along on the comeback trail and new districts are in prospect. The cooperative geologic studies during the great depression years have had for their main purpose the production of geologic data that would aid the gold miner. Preliminary reports and bulletins covering recent field work are in progress of preparation.

The much improved economic position of the base metals, lead and zinc; the increasing industrial importance of the light metals, aluminum and beryllium; the growing importance of non-metallic minerals in the soil's conservation and rejuvenation program, and in the building industry; and the increasing importance of tungsten and fine steel alloying elements, are other phases of our mineral industry which it is hoped may have proper geological consideration. The ground-water situation in many parts of Idaho, which is becoming increasingly serious, is a basic geologic problem, and the bureau hopes its budget for the 1937-38 biennium may permit studies and allow it to render greater service in this field.

Preliminary reports and bulletins in progress on the following projects:

Murray-Pritchard gold district, Shoshone County. (Head geologist, P. J. Shenon, U.S.G.S.) This project was initiated in the spring of 1935 and completed the summer of the same year. Report covering this project is well along toward completion and publication of it is expected in June, 1937.
Boise Basin survey, Boise County. (Head geologist, Alfred L. Anderson, Idaho School of Mines and U.S.G.S.) The initiation of this project dates back to 1932. Report is in manuscript form in the office of the Director of the U. S. Geological Survey where it is undergoing critical reading and revision. Publication of this extensive and most excellent report is expected early in 1937.

Placer ground studies in the Burgdorf, Warren, Florence, and Slate Creek districts, Idaho County. (Head geologist, J. C. Reed, U.S.G.S.) This project was initiated in 1934. The field project has not been completed, but field data acquired up to date have been written up and will be published in pamphlet form. Publication is expected early in the new year.

Silver Belt district near Kellogg, Shoshone County. (Head geologist, P. J. Shenon, U.S.G.S.) This survey, which was opened as a new project early in 1936, has for its purpose a thorough geologizing of the silver belt district.

ADMINISTRATION BUILDING,
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in the vicinity of the famous Sunshine mine. It is anticipated that the study will be continued over a period of at least two years. A report, therefore, will not be forthcoming until perhaps the spring or fall of 1938.

MINING AND METALLURGICAL RESEARCH

It is the aim of this division of the bureau to contribute in any possible way toward efficient and economic utilization of the State's mineral resources. Service is rendered in various ways: (1) By correspondence in answering questions and supplying technical and operating data and suggestions; (2) by metallurgical study of complex and difficult ores where solution of such problems is of value to mining generally, and (3) by research and experiment, having for its objective greater elucidation of metallurgical and extractive fundamentals, often leading to improvement in old processes and sometimes wholly new processes. The problems having received special study are ore-dressing and gold and silver recovery. Research on many phases of the flotation process is continuously under way. Methods of gold flotation, non-metallic mineral flotation, and certain phases of sulphide flotation have received special attention. These projects are under the immediate direction of Mr. Fahrenwald.

This year, we have three research Fellows, two of whose stipends of $540.00 per annum each are provided by the U. S. Bureau of Mines. These research men devote approximately one-half of their time to laboratory study of an assigned metallurgical problem; the other half of their time is for study in the University of Idaho. At the end of the year, upon satisfactory work, the Fellow is awarded his master's degree.

GENERAL SERVICE TO THE PUBLIC

Many people of the State who own mines, or are seeking mineral deposits, visit the offices of the bureau. A far larger number write letters, asking for information and suggestions. Their inquiries are answered by the director, or members of the technical staff. Questions upon the various aspects of prospecting, gold mining, and milling, requests for pamphlets, and for the identification of minerals, have totaled from 2000 to 3000 per year. The minerals of approximately 1000 samples and specimens were identified for mining people in the 1935-36 biennium. All mineral identification is done by Dr. F. B. Laney, head of the geological department.

Assays. Occasionally prospectors and others desire to learn through the bureau the assay value of ore. It is not possible for the bureau to do free assaying because (1) it would require a considerable appropriation, (2) it would compete with private commercial assayers, (3) the bureau would be submerged with requests for assays in numbers impossible to handle. When, however, it is urgently desired, the samples are turned over to a competent chemist for assay, who charges standard fees and in whose work the bureau has full confidence.

As required by the act of legislature in 1931, the bureau has kept informed upon drilling for oil and gas, and has samples of cores of the beds drilled in the Payette-Weiser regions.

The War Department has been supplied with information upon sources of metals in the State. Two irrigation districts have expressed appreciation for help given in cooperation with the State Bureau of Reclamation. Cooperation with the federal and state reclamation services in the survey of underground water resources of the Snake River plains has been completed.

Cordial relations have been established with the Forest Service, which has given prospectors courteous assistance, and has done much to make accessible the interior gold areas by building roads and trails.

The bureau stands ready, so far as its funds permit, to cooperate with other state bureaus in geological studies of artesian water possibilities, prevention of soil erosion, preservation of grazing ranges by soil development and protection, prevention of alkali accumulations on irrigated lands, and location of materials available for road work.
The value of geological study in mining is winning popular appreciation. It is realized that ore deposits, when formed, sought certain rock formations in preference to others. One class of rock (igneous) has a peculiar importance, because ore solutions originated with these before the deposition of ore in veins. The geologist can point out the favorable and unfavorable formations and structures after all details have been mapped. Underground development is expensive and geological study can warn against doing such work in the wrong places or in the wrong direction, besides aiding in ore-finding.

Mining and metallurgical research of the bureau has shown how to make profit from ore left in the ground when methods were crude; laboratory discovery from time to time creates a profit where there had been a loss. These activities pay for themselves many times over in money saved and new wealth made by mining people.

The following bureau publication was issued in 1936:


Reports and articles which the bureau could not print and distribute, because of lack of funds, the scientific societies and journals have been glad to publish. Those who are interested in reading them may find them in university and city libraries. Such articles published in 1936 are as follows:


NOTE: All publications marked * (out of print) may be consulted in public libraries and libraries of instructional institutions.

**Issued by the U. S. Geological Survey**

In cooperation with the Idaho Bureau of Mines and Geology


**BULLETIN NO. 846-d**—"Some lode deposits in the northwestern part of Boise Basin, Idaho," by Clyde P. Ross, 1934. (Obtainable from the Superintendent of Documents, Washington, D. C., for 35 cents.)

**BULLETIN NO. 854**—"Geology and ore deposits of the Casto quadrangle, Idaho," by C. P. Ross, 1934. (Obtainable from the Superintendent of Documents, Washington, D. C., for 60 cents.)


**CIRCULAR NO. 9**—"Geology and ore deposits of the Elk City, Orogrande, Buffalo Hump, and Tenmile districts, Idaho County, Idaho," by P. J. Shenon and J. C. Reed, 1934. (Obtainable from the Director of the U. S. Geological Survey, Washington, D. C.)
Issued by the U. S. Bureau of Mines

In cooperation with the Idaho Bureau of Mines and Geology


Publications in Technical Magazines


"Effects of reagents on aqueous suspensions of pulverized materials and relation of this effect to flotation concentration," by A. W. Fahrenwald, American Chemical Society, 1932.


Publications of the Idaho Bureau of Mines and Geology

MOSCOW, IDAHO

*Publications out of print.

**BULLETIN NO. 1**—"The copper deposits of the Seven Devils and adjacent districts," by D. C. Livingston and F. B. Laney. 1920.


**BULLETIN NO. 5**—"Geology and ore deposits of Alturas quadrangle, Blaine County, Idaho," by Samuel M. Ballard. 1922.

**BULLETIN NO. 6**—"Geology and water resources of Goose Creek Basin, Cassia County, Idaho," by Arthur M. Piper. 1923. (Prepared in cooperation with the U. S. Geological Survey.)

**BULLETIN NO. 7**—"Geology and gold resources of north central Idaho," by Francis A. Thomson and Samuel M. Ballard. 1924.


**BULLETIN NO. 11**—"Geology and metalliferous resources of the region about Silver City, Idaho," by Arthur M. Piper and Francis B. Laney. Price 50 cents. 1926.


**BULLETIN NO. 14**—"Geology and mineral resources of eastern Cassia County, Idaho," by Alfred L. Anderson. Price 50 cents. 1931.


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**PAMPHLET NO. 1**—"Interfacial tension measurements and some applications to flotation," by Robert B. Elder, 1921. (Prepared in cooperation with the U. S. Bureau of Mines.)

**PAMPHLET NO. 2**—"Size of mineral particles in relation to flotation concentration," by A. W. Fahrenwald. 1921. (Prepared in cooperation with the U. S. Bureau of Mines.)

**PAMPHLET NO. 3**—"Testing ores for flotation," by A. W. Fahrenwald. 1921. (Prepared in cooperation with the U. S. Bureau of Mines.)

**PAMPHLET NO. 4**—"Differential flotation," by A. W. Fahrenwald. 1921. (Prepared in cooperation with the U. S. Bureau of Mines.)


*PAMPHLET NO. 8—"Ground water supply at Moscow, Idaho," by F. B. Laney, V. R. D. Kirkham, and A. M. Piper. 1923.

*PAMPHLET NO. 9—"Ground water in Pahsimeroi Valley, Idaho," by Oscar E. Meinzer. 1924.


*PAMPHLET NO. 11—"Geology and water resources of the Bruneau River Basin, Owyhee County, Idaho," by Arthur M. Piper. (Prepared in cooperation with the U. S. Geological Survey.)

PAMPHLET NO. 12—"Possibilities of petroleum in Power and Oneida Counties, Idaho," by Arthur M. Piper. 1924.


PAMPHLET NO. 16—"Ground water for municipal supply at Idaho Falls, Idaho," by Arthur M. Piper and Virgil R. D. Kirkham. 1924.

*PAMPHLET NO. 17—"Ground water for municipal supply at St. Maries, Idaho," by Virgil R. D. Kirkham, 1926.

*PAMPHLET NO. 18—"Some Miocene and Pleistocene drainage changes in northern Idaho," by Alfred L. Anderson. 1927.


*PAMPHLET NO. 20—"A disseminated lead prospect in northern Boise County, Idaho," by Clyde P. Ross, 1926. (Prepared in cooperation with the U. S. Geological Survey.)

*PAMPHLET NO. 21—"The Vienna district, Blaine County, Idaho," by Clyde P. Ross, 1927. (Prepared in cooperation with the U. S. Geological Survey.)

*PAMPHLET NO. 22—"The geology and ore deposits of the South Mountain mining district, Owyhee County, Idaho," by Robert E. Sorenson, 1927.

PAMPHLET NO. 23—"Ground water for municipal supply at Potlatch, Idaho," by Virgil R. D. Kirkham. 1927.


*PAMPHLET NO. 31—"Geology and silver ore deposits of the Pend Oreille district, Idaho," by Edward Sampson, 1928. (Prepared in cooperation with the U. S. Geological Survey.)
PAMPHLET NO. 32—"Geology and ore deposits of the Lava Creek district, Idaho," by Alfred L. Anderson. 1929.

PAMPHLET NO. 33—"Geology and ore deposits of the Seafoam, Alder Creek, Little Smoky, and Willow Creek mining districts, Custer and Camas counties, Idaho," by Clyde P. Ross. 1930. (Prepared in cooperation with the U. S. Geological Survey.)

PAMPHLET NO. 34—"The geology and mineral resources of the region about Orofino, Idaho," by Alfred L. Anderson, 1930.


PAMPHLET NO. 38—Biennial report on the activities of the Bureau, by John W. Finch.

PAMPHLET NO. 39—"The Dome mining district, Butte County, Idaho," by Clyde P. Ross. 1933. (Prepared in cooperation with the U. S. Geological Survey.)


PAMPHLET NO. 43—"A preliminary report on the geology and ore deposits of the eastern part of the Yellow Pine District, Idaho," by L. W. Currier. 1935. (Prepared in cooperation with the U. S. Geological Survey.)


Idaho contains an area of 83,888 square miles. The state is divided into 44 counties, 36 of which can be classed as having minerals of commercial importance. In 22 of these counties there are producing mines.

In the past practically all mining has been confined to the five principal metals: Lead, silver, gold, zinc, and copper, which are widely distributed throughout the state. In addition to these a great variety of uncommon metals and minerals occur in sufficient extent to be of commercial importance.

This great diversity of mineral wealth establishes Idaho as one of the principal mining states of the Union. It also makes mining the second most important industry in the State.

The importance of Idaho's mineral wealth is well shown by statistical facts based on the production and exploitation of the five principal metals, lead, silver, gold, zinc, and copper.

Total metal production since 1860, more than $1,300,000,000.
Average annual production for past 28 years, more than $26,000,000.
Average annual mine payroll, more than $9,000,000.

See pages 102-103 for publisher's address, meaning of reference marks, and abbreviations.


GENERAL REFERENCES

Retracement of the boundary line between Idaho and Washington from the junction of Snake and Clearwater rivers northward to the international boundary, by R. B. Marshall: U. S. Geol. Survey Bull. 466, 1911.‡
An old erosion surface in Idaho, by J. B. Umpleby: Jour. Geology, vol. 20, pp. 139-147, 1912.§
The Idaho peneplain, by Waldemar Lindgren (Discussion): Econ. Geology, vol. 13, pp. 486-488, September, 1918.§
An old erosion surface in Idaho, by D. C. Livingston (Discussion of Mr. Rich's article): Econ. Geology, vol. 13, pp. 488-492, September, 1918.§
Mineralogy of some black sands from Idaho, with a description of the methods used for their study, by E. V. Shannon, No. 2398: U. S. Nat. Museum Proc., vol. 60, art.3, pp. 1-33, 1921.


Some pseudo-eutectic ore textures, by Alfred L. Anderson: Econ. Geol., vol. XXIX, No. 6, 1934.


Contact phenomena associated with the Cassia batholith, Idaho, by Alfred L. Anderson: Jour. of Geol., vol. XLII, No. 4, 1934.


IDaho Mineral Resources

Antimony

Deposits of antimony, principally the sulphide (stibnite), are found in Shoshone County, Valley, Boise, Blaine, Idaho, Owyhee, and Custer counties. Those in the Coeur d'Alene district of Shoshone County have been extensively developed; a number of mills for the concentration of the ore have been constructed; and in the past a large tonnage has been produced and marketed. The deposits in Blaine, Valley, and Owyhee counties contain a high-grade ore, most of which can be shipped without preliminary treatment. During the war, when antimony commanded a high price, a large tonnage was produced and shipped from the mines in Valley County.

Antimony occurs as an accessory mineral in many lead-zinc ore bodies, also in stibnite-bearing veins in which it is the dominating metallic mineral. All of the antimony ores carry more or less silver, and many of them, particularly those of Blaine County, are more valuable for this mineral than for the antimony.

In all the above-mentioned counties there are many deposits containing a large available tonnage of commercial ore, which can be readily marketed when freight and market conditions will permit it to be produced at a profit.

The Livingston mine, Custer County, Idaho, by J. B. Stewart: Mining and Metallurgy, vol. 7, No. 233, pp. 223-224, May, 1926.§

Arsenic

Deposits of arsenic, principally the sulphide (arsenopyrite), occur in Blaine, Gem, and Boise counties. These deposits, although not fully developed, show a large available tonnage containing sufficient arsenic to be valuable for this metal, which can be readily marketed when the demand for it will permit profitable production. Arsenic occurs also as arsenopyrite in Ada, Elmore and Kootenai counties, but the deposits in these counties have not been sufficiently developed to ascertain the possible tonnage.


Asbestos

Commercial asbestos occurs in two forms: The chrysotile variety, which is adapted to spinning; and the amphibole variety, which is not adapted to spinning but is used extensively in shingles, insulation materials, paper stock, cements and paints.

Amphibole asbestos occurs extensively in Idaho County, near Kamiah. There is a large demonstrated tonnage, but the demand is small, on account of market and freight rates. Deposits containing chrysotile have been reported in Fremont, Teton and Idaho counties.


Barytes

Barytes (barium sulphate) is used in the rubber, paper, linoleum, ink, and paint manufacturing industries. Its principal use is in the manufacture of lithopone, a white pigment consisting of about 70 per cent barium sulphate and 30 per cent zinc sulphide.

Some of the largest deposits of high-grade barytes found west of the Mississippi River occur in the Deer Creek and Muldoon sections of Blaine County. A new and large deposit of Barite in Idaho, by Arthur Lakes: Min. Reporter, Aug. 16, 1906.

BENTONITE

Bentonite, a plastic clay, is valuable for its high absorbent qualities; it has a capacity of absorbing three times its weight or about seven times its volume of water. It is used in beauty clays; for refining oil; as a filler in paper and soaps; as an adulterant in drugs and candies; and as a packing for horses' hoofs.

Bentonite occurs in commercial quantities in Clark and Custer counties, and it has been reported to be found in Cassia, Owyhee, and Oneida counties.


BERYLLIUM AND BERYL

Beryllium, or glucinum, is often listed as a rare element, though it probably is more abundant in the earth's crust than many of the minor metals that are ordinarily considered rather common. Beryllium is very light and exceptionally hard and strong, and many believe that it is destined to share with magnesium and aluminum in the fast-growing demands for light metals to be used in the construction of air craft. It is very light, having about the same specific gravity as magnesium, and is almost as hard as quartz.

The mineral beryl, which seldom contains more than about 5 per cent of the element, is the only recognized ore of beryllium. It is a common accessory in pegmatite veins and is also found in clay slate and mica schist, but hertofore only the gem varieties, including emerald and aquamarine, have been actively sought.


BISMUTH

Bismuth, occurring as a sulphide, has been found in Blaine County unassociated with other metals, as well as in association with many of the lead ores. It also occurs in the gold ores of the Gold Hill, Balshazzar, and Buckskin mines, Boise County, in association with lead, probably galenobismuthite or similar lead-bismuth minerals.

BUILDING STONE

Sandstone exceptionally adapted to building purposes is found in Ada, Bear Lake, and Cassia counties. One of the principal enterprises in Ada County is that of the Boise Stone Co. in quarrying and converting sandstone to building purposes.


CLAY

The different kinds of clay have so many uses that it is probably impossible to list them all, but the following rough classification will serve to point out the great variety of products that contain clay: Structural products: Common brick, tile, etc. Refractories: Fire clay brick and special refractories. Pottery: Tableware, kitchenware, sanitary ware, etc.

Clay suitable for structural purposes is found in almost every county in the state, the better grades occurring in Benewah, Cassia, Kootenai, Latah, Lewis, Idaho, Power, and Washington Counties.

Clay suitable for refractories and pottery is found in Latah County. The refractory clay is high-grade. One deposit is being exploited, and the manufactured articles are in great demand throughout the Pacific Northwest states.


Composition and origin of certain commercial clays of northern Idaho, by Edward L. Tullis and F. B. Laney, vol. 28, No. 5, Econ. Geol. 1933.


COAL

Bituminous coal of commercial importance occurs in Teton, Bonneville, Fremont, and Clark counties. No attempt has been made to exploit any of the deposits commercially except those in Horseshoe Basin, Teton County.

In Owyhee and Boise counties several beds of low-grade lignite occur. The largest and best developed of these is that on Reynolds Creek, Owyhee County, which has been shipping considerable fuel for local domestic use.


The Horseshoe Creek district of the Teton Basin coal field, by E. G. Woodruff: U. S. Geol. Survey Bull. 541, pp. 379-388, 1912. (Teton County.)


COBALT

Cobalt is found in Lemhi County. During the World War, when this metal commanded a high price, the deposits were actively developed; a small mill was constructed, and concentrate with a high cobalt content was produced. This metal is reported to have been found also in Kootenai and Latah counties.


Geology and ore deposits of Lemhi County, by J. B. Umpleby: U. S. Geol. Survey Bull. 528, 1913.


COPPER

Idaho is an important producer of copper and holds a high position among the ranking states of the Union. The many copper mines which are now under development and the numerous discovered but undeveloped veins indicate that the production of this metal will be greatly increased; the State will then be elevated to a rank higher than it now holds.
Gold and silver are found associated with practically all the copper ores, and in some counties, notably in Custer and Bonner, the silver content is more valuable than the copper.

Custer, Lemhi, and Shoshone are the most important copper-producing counties: Adams and Washington counties may eventually become large producers. Bonner, Idaho, Blaine, Butte, Clearwater, Latah and Lewis counties also contain copper mines of importance.


DIATOMACEOUS EARTH

Diatomaceous earth is more commonly known as infusorial earth, and is sometimes referred to by its German name of kieselguhr. It is composed of the siliceous remains of minute aquatic plants known as diatoms.

The principal uses of diatomaceous earth are: Sawed brick for refractory and insulation purposes; filter material at sugar factories; light-weight filler in concrete; in polishing powders; absorbent in dynamite, and in thermal insulator compounds.

Extensive beds of this mineral, in which it can be measured by the acre, are found in Owyhee, Elmore, Camas, Payette, Washington, and Idaho counties. A small tonnage has been obtained from Elmore County for use in Idaho sugar factories.


FELDSPAR

Common feldspars are crystalline compounds of silica, alumina, and one or more of the bases: potash, soda, and lime. There are two principal classes of feldspar—the one including the potash and potash-soda varieties; the other including the soda, soda-lime, and lime varieties. Pure potash feldspars are orthoclase and microline. The principal use of feldspar is in the manufacture of pottery, chinaware, porcelain, enamel ware, and enamel brick and tile.

Deposits of high-grade feldspar, occurring as orthoclase, are found in Latah and Adams counties.

GARNET

Garnet is a common accessory mineral in a large variety of rocks, occurring abundantly in contact metamorphic zones and in metamorphosed crystalline limestone. Deposits of garnet possessing the necessary qualifications for ornamental or industrial use and so situated with regard to transportation and markets that they can be exploited commercially are relatively small and occur in only a few areas throughout the United States.
The principal uses of garnet are: As settings in jewelry; jewel bearings in watches; and as an abrasive. Abrasive garnet is utilized either in the form of a manufactured paper similar to sandpaper, or as loose grain or powder for grinding and polishing.

Extensive deposits of garnet adapted to abrasive purposes occur in Adams, Lemhi, Custer, and Cassia counties.

GOLD

Gold is found in most counties of the State and is one of the most widely distributed metals. Prior to the World War, Idaho was an important producer of this metal, but during the war period many of the mines of which the principal product was gold were closed down and have not been reopened, so at the present time the State ranks only seventh in the United States in gold production.

Gold occurs associated with almost all the lead, zinc, copper, and silver ores, and very commonly in a free-milling condition. A large amount of gold is obtained from placer deposits; at one time Idaho was among the principal placer-mining states in the Union. The greater part of the placer ground which could be hydraulicked has been exhausted, but many acres suitable for dredging still remain and the gold lode-deposits offer greater opportunities than those of almost any other State.

The most important counties in which gold occurs are Boise, Idaho, Lemhi, Owyhee, Elmore, Shoshone, Custer, Blaine, Camas, Clearwater, Gem, and Valley.


An Idaho silver-gold camp (Florida Mountain district), by F. G. Corning: Eng. and Min. Jour., vol. 60, p. 244, Sept. 14, 1895.§


Geology of Thunder Mountain and central Idaho, by R. N. Bell: Eng. and Min. Jour., vol. 73, pp. 791-793, June 7, 1902.§


The north side of the Coeur d’Alene district, by H. S. Auerbach: Eng. and Min. Jour., vol. 86, pp. 65-70, July 11, 1908.§


Atlanta gold district, by R. N. Bell: Eng. and Min. Jour., vol. 86, pp 176-177, July 25, 1908.§


Some gold deposits of the Northwest, by F. C. Lincoln: Eng. and Min Jour., vol. 92, p. 408, Aug. 26, 1911.§


Big Creek gold district, Idaho, by R. N. Bell: Eng. and Min. Jour., vol. 94, pp. 891-892, Nov. 9, 1912.§


Geology and ore deposits of Lemhi County, by J. B. Umpleby: U. S. Geol. Survey Bull. 528, 1913.*


Geology and ore deposits of the Mackay region, Idaho, by J. B. Umpleby: U. S. Geol. Survey Prof. Paper 97, 1917.§


Mineralogy of some black sands from Idaho, with a description of the methods used for their study, by E. V. Shannon: U. S. Nat. Mus. Proc., vol. 60, art. 3, pp. 1-58, 1921.‡


Geology and gold resources of Boise Basin, Boise County, Idaho, by S. M. Ballard: Idaho Bureau of Mines and Geology Bull. 9, 1924.**


Geology and metalliferous resources of the region about Silver City, Idaho, by A. M. Piper and F. B. Laney: Idaho Bureau of Mines and Geology Bull. 11, 1926.*


The Vienna district, Blaine County, Idaho, by C. P. Ross: Idaho Bureau of Mines and Geology Pamphlet 21, 1927.**


Geology and ore deposits of the Seafoam, Alder Creek, Little Smoky and Willow Creek districts, Custer and Camas counties, by C. P. Ross: Idaho Bureau of Mines and Geology Pamphlet 33, 1930.*

Geology and mineral resources of the region about Orofino, Idaho, by A. L. Anderson: Idaho Bureau of Mines and Geology Pamphlet 34, 1930.**


Thunder Mountain mining district, by Clyde P. Ross: vol. 28, No. 6, Economic Geol., 1933.


Geology of the Pearl-Horseshoe Bend gold belt, Idaho, by Alfred L. Anderson: Idaho Bureau of Mines and Geology Pamphlet 41, 1934.**


** SNAKE RIVER GOLD **


Gold dredging on Snake River in Idaho, by F. Powell: Eng. and Min. Jour., vol. 70, pp. 385-396, Oct. 6, 1900.§


The origin of the fine gold of the Snake, by R. N. Bell: Eng. and Min. Jour., vol. 73, pp. 143-144, 1902.§


Annual reports of the Idaho Inspector of Mines, 1899 to 1919.

Flotation of gold from river sand and black sand, by A. W. Fahrenwald: the Mining Journal, Phoenix, Arizona, April 30, 1933.


**GRAPHITE**

Graphite is a soft, black, greasy form of carbon, sometimes referred to in trade as “plumbago” and “black lead.” It occurs in nature in two forms, crystalline and amorphous, each having its own peculiar uses.

The physical properties of graphite—infusibility, chemical inertness, high conductivity, extreme softness, and low specific gravity—fit it for a large number of uses. The manufacture of crucibles and other refractory products; lubricants; “lead” pencils; paints; stove polish; foundry facings; and various types of electrical appliances.

Graphite of commercial importance is found in Blaine County, but, owing to the fact that at the ordinary price of graphite it is possible to mine only the most favorably situated deposits, the known deposits in Idaho have never received much attention.

**GYPSUM**

Gypsum is a natural hydrated sulphate of lime. It is a soft, white chalk-like material, found widely distributed in single crystals and in thick beds. The natural product is generally very pure.

The principal uses of gypsum are as structural material—wall plaster, gypsum boards, blocks and tile—and is an ingredient of Portland cement and plaster of Paris.

Extensive deposits of high-grade gypsum are found in Lemhi, Bear Lake, and Washington counties. These deposits have never been developed, as the low price of the crude product limits production to those States located near the centers of population.

**LEAD**

Lead is the most important metal found in Idaho, and this State ranks second in the United States in the production of lead, Missouri ranking first, and Utah third. Idaho produces over one-fourth of the total amount of lead mined in the United States. Lead is widely distributed throughout the State, and occurs as galena (lead sulphide) and as the oxide and carbonate; silver is always associated with it, and occasionally zinc, gold and copper.

The largest lead mine in the United States is in Idaho—the Bunker Hill & Sullivan M. & C. Co., at Kellogg. This is one of the few companies in the
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world that mine, mill, smelt, refine, manufacture, and market lead and lead products.

The principal lead mines in the State are those in Shoshone County, which produces 85 per cent of the State total. Blaine, Boundary, Bonner, Custer, Lemhi, Boise, Butte, Valley, and Camas counties are the other important lead-producing counties.

A bibliography of mining, milling and metallurgical methods will be found under the county in which the plant or mine is located.


Ore deposits of Yreka district, Idaho, by E. McCormick: Eng. and Min. Jour., vol. 69, p. 404, April 7, 1900.§


The Coeur d'Alene in 1905, by S. A. Easton: Eng. and Min. Jour., vol. 81, p. 11, Jan. 6, 1906.§


The geology and ore deposits of the Coeur d'Alene district, by F. L. Ransome and F. C. Calkins, reviewed by E. R. Buckley: Econ. Geology, vol. 4, pp. 178-186, 1909.§

Geology and ore deposits of the Coeur d'Alene, by F. C. Calkins, discussion of review by E. R. Buckley: Econ. Geology, vol. 4, pp. 258-261, April, 1909.§


The Coeur d'Alene mining district, by F. R. Ingalsbe: Eng. and Min. Jour., vol. 96, pp. 156-158, July 26, 1913.§

Secondary enrichment in the Caledonia mine, Coeur d'Alene district, Idaho, by E. V. Shannon: Econ. Geology, vol. 8, pp. 565-570, September, 1913.§


Geology and ore deposits of Lemhi County, by J. B. Umpleby: U. S. Geol. Survey Bull. 525, 1913.*


Origin and distribution of ore in the Coeur d'Alene, by O. H. Hershey, published for the author as a pamphlet by the Min. and Sci. Press, 32 pp., 1916.*


A reconnaissance of the Pine Creek district, Idaho, by E. L. Jones, Jr.: U. S. Geol. Survey Bull. 710, pp. 1-36, 1919.§

Linarite and leadhillite from Idaho, by E. V. Shannon: Am. Mineralogist, vol. 4, No. 8, pp. 93-94, August, 1919.§

A reconnaissance of south-central Idaho, embracing Thunder Mountain, Big Creek, Stanley Basin, Sheep Mountain, and Seafoam districts, by J. B.
MINING INDUSTRY OF IDAHO


Deformation in ores, Coeur d'Alene district, Idaho, by W. A. Waldschmidt: Econ. Geology, vol. 20, pp. 573-586, September-October, 1925.§
Big silver-lead producer in Idaho (Hecla mine), by W. E. Carr; Compressed Air Mag., vol. 30, pp. 1375-1379, September, 1925.§
Geology and ore deposits of Boundary County, Idaho, by V. R. D. Kirkham and E. W. Ellis: Idaho Bureau of Mines and Geology Bull. 10, 1926.**
The Livingston mine, Custer County, Idaho, by J. B. Stewart: Mining and Metallurgy, vol. 7, No. 223, pp. 222-224, May, 1926.§
Some Coeur d'Alene geology, by J. E. Berg: Mining and Metallurgy, vol. 8, July, 1927.§
The Vienna district, Blaine County, Idaho, by C. P. Ross: Idaho Bureau of Mines and Geology Pamphlet 21, 1927.**
A lead ore consisting of native lead, leadhillite and lethargite, by E. V. Shannon: Econ. Geology, vol. 22, pp. 826-829, December, 1927.**
A geologic error regarding the Wood River district, by Stewart Campbell: Eng. and Min. Jour., vol. 126, pp. 287-289, Aug. 25, 1928.§
Geology and ore deposits of the Birch Creek district, Idaho, by P. J. Shenon: Idaho Bureau of Mines and Geology Pamphlet 27, 1928,**
Geology and ore deposits of the Lava Creek district, Idaho, by A. L. Anderson: Idaho Bureau of Mines and Geology Pamphlet 32, 1929.**
Geology and ore deposits of the Seafoam, Alder Creek, Little Smoky and Willow Creek districts, Custer and Camas counties, Idaho, by C. P. Ross: Idaho Bureau of Mines and Geology Pamphlet 33, 1930.*
Sequence of ore deposition in north Idaho, by A. L. Anderson: Econ. Geology, vol. 25, pp. 160-175, March-April, 1930.**
Geology and ore deposits of the Clark Fork district, by A. L. Anderson: Idaho Bureau of Mines and Geology Bull. 12, 1930.**
LIMESTONE

Limestone is mined in Bannock, Butte, Boise, Clearwater, Teton, and Bonner counties; Blaine and Bear Lake counties also contain deposits of importance. The limestone mined in Bonner County is shipped to Spokane, Washington, where it is manufactured into Portland cement; the limestone mined in Butte and Teton counties is shipped to the sugar factories of Idaho and Utah, where it is used in the refining of sugar; the limestone mined in Bannock County is manufactured into cement, the plant being located adjacent to the quarry; the limestone mined in Boise and Clearwater counties is sold to the agricultural and poultry industries and burnt to form plaster lime.

There are unlimited deposits which are suitable to the foregoing industries.

MANGANESE

Manganese occurs in Bannock, Lemhi, Owyhee, Shoshone, Butte, and Washington counties. Some of the deposits are high in manganese content and others in manganese-iron. A substantial tonnage has been produced and marketed from the mines of Bannock County, and the deposits of Lemhi County constitute a large potential resource.


MARBLE

Marble is dense crystalline calcium carbonate, formed from limestone by the pressure of overlying sediments and the action of underground water. The value depends on the color, which may be white, gray, red, black, or veined, and on the grain of the structure. Its principal use is for building and monumental purposes.

Marble suitable to commercial purposes occurs in Nez Perce, Butte, and Cassia counties. The deposits in Nez Perce and Butte counties have been slightly exploited.

MICA

The principal physical properties which give value to mica are: Its cleavage, transparency, resistance to decomposition, and nonconduction of electricity and heat. The important uses of mica are: Short mica, in the electrical industries and as glazing for stoves, screens, goggles, and lantern projection; ground mica, in fancy paints, wallpaper, tiles, concrete, rubber goods, roofing materials, lubricants, and insulating compounds.

Deposits of commercial importance occur in Latah, Adams, and Idaho counties, although they have never been prospected or developed in proportion to the possibilities which they offer.


MINERAL WATERS

Mineral springs of various types occur at a great many places throughout the State, the principal types being calcareous chalybeate, sulphurated, and
saline. The temperatures of the different types vary from "cold" to "hot" with some of the latter exceeding the boiling point. Hot springs are more numerous, and at many of them sanatoriums and bathing resorts have been erected. The chalybeate springs of Caribou County are particularly efficacious from a therapeutic standpoint, although they have never been exploited.

**MOLYBDENUM**

Molybdenum, occurring as the sulphide disseminated in intrusive rocks and as a molybdate of lead in fissure veins in limestone, is found in Elmore, Boundary, Custer, Idaho, and Lemhi counties.

Tungsten, cinnabar, manganese, molybdenum and tin deposits of Idaho, by D. C. Livingston; Univ. of Idaho School of Mines Bull. 2, vol. 14, 1919.**


**MONAZITE**

The mineral monazite consists chiefly of the phosphate of cerium and variable amount of thorium, the value depending primarily upon the thorium content. It is a resinous golden-yellow mineral occurring as a placer in practically all of the gold placer mines of the State; the quantity varies, and in some of the deposits it is not sufficient to be of commercial importance. The placer deposits of Ada, Idaho, Lemhi, and Owyhee counties contain an appreciable amount of this mineral, and those of Boise and Clearwater counties contain sufficient to be of commercial importance.

The principal use of thorium is in the manufacture of incandescent mantles for gas lighting. Practically all of the monazite used in the United States is imported from Brazil and India.


**NICKEL**

Nickel is found in Lemhi County. During the late war considerable development work was done on the veins in which it occurs. These deposits are described by Frank L. Hess under "Cobalt" in U. S. Geological Survey Mineral Resources of the United States, pt. I, 1917.

**NITRATES**

The occurrence of nitrate in Bannock, Bingham, Bonneville, Camas, Caribou, Clark, Custer, Elmore, Fremont, and Owyhee counties has been reported. Nitrate deposits in southern Idaho and eastern Oregon by G. R. Mansfield: U. S. Geol. Survey Bull. 620, pp. 19-44, 1915.*


**OIL AND GAS**

The same formations which are oil-producing in Wyoming are present in structures highly favorable to the accumulation of oil and gas in Caribou, Bonneville, Teton, Bear Lake, and Bingham counties. A small amount of drilling has been done in Caribou and Teton counties, but the wells were never completed to a sufficient depth to determine the possibilities of the occurrence of oil.

Gas has been developed in Payette and Washington counties.
Phosphate rock

The greatest potential mineral resource in Idaho is the immense phosphate rock deposits in Bear Lake, Caribou, Bannock, Bingham, and Bonneville counties. Conservative estimates by members of the U. S. Geological Survey, accredit Idaho with over 85 per cent of the total phosphate resources of the United States in 268,299 acres out of a total of 396,612 acres.


Geography, geology, and mineral resources of the Fort Hall Indian Reservation, Idaho, by G. R. Mansfield: U. S. Geol. Survey Bull. 713, 1920.‡


The Idaho phosphate field, by G. R. Mansfield: Mining and Metallurgy, vol. 9, No. 255, January, 1928.§


**PYRITE**

Pyrite of commercial importance is found in Washington County. The development work which has been done on these deposits indicates an immense available tonnage.

**QUICKSILVER**

Cinnabar, the sulphide of mercury, has been found in the placer deposits of Custer and Valley counties and in lode-deposits of Valley, Blaine, and Cassia counties. The quicksilver lode-deposits of Valley County are being extensively developed, and a little mercury has been produced from an experimental plant. The other deposits have never been opened.


Quicksilver and antimony discoveries in Central Idaho, by R. N. Bell: Idaho Mining Department Bull. 1, 1918.*


**RUTILE**

The occurrence of rutile in Clearwater County has been reported. Rutile, the natural titanium oxide, is used in paints; arc-light electrodes; dyes; and in the manufacture of leather.

**SALT**

The pioneers evaporated the brine from the salt springs of Caribou County, and this salt was transported to all of the northwestern states before the building of the railroad. The salt obtained from these springs is above the average of the commercial salts of the United States in purity and compares favorably with some of the best salt produced.


**SILVER**

Idaho was again the largest producer of silver in the United States, followed by Montana. The output of silver in Idaho in 1935 was about 10,150,000 ounces.

The largest producer of silver in the United States is the Sunshine Mine in Shoshone County.
Silver is found associated with all the lead, copper, zinc, and antimony ores of the State, and occasionally in associations in which it is the principal metal. It is one of the most widely distributed metals, and its occurrence is such that the mining of silver can hardly be separated from that of the other metals. Shoshone County produces more silver than any other county in the State; the other important silver-producing counties are: Lemhi, Custer, Bonner, Boundary, Blaine, Butte, Owyhee, Boise, Camas, Valley, Washington, Idaho, Elmore, Adams and Cassia.

The bibliography for those ores in which silver is a secondary metal, will be found classified under the principal ore. Mining, milling and smelting methods will be found under the county in which the plant is located.


An Idaho silver-gold camp (Florida Mountain district), by F. G. Corning: Eng. and Min. Jour., vol. 60, p. 244, Sept. 14, 1895.§


The deepest mine in Idaho, the Ramshorn at Bay Horse, by R. N. Bell: Mines and Minerals, vol. 21, pp. 174-176, November, 1900.*


The Coeur d'Alene in 1905, by S. A. Easton: Eng. and Min. Jour., vol. 81, p. 11, Jan. 6, 1906.§


The geology and ore deposits of the Coeur d'Alene district, by F. L. Ransome and F. C. Calkins, reviewed by E. R. Buckley: Econ. Geology, vol. 4, pp. 175-186, 1909.§

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Geology and ore deposits of Lemhi County, by J. B. Umpleby: U. S. Geol. Survey Bull. 528, 1913.*


Secondary enrichment in the Caledonia mine, Coeur d'Alene district, Idaho, by E. V. Shannon: Econ. Geology, vol. 8, pp. 565-570, September, 1913.§


Geology and ore deposits of the Mackay region, Idaho, by J. B. Umpleby: U. S. Geol. Survey Prof. Paper 97, 1917.‡


A reconnaissance of the Pine Creek district, Idaho, by E. L. Jones, Jr.: U. S. Geol. Survey Bull. 710, pp. 1-36, 1919.‡


Big silver-lead producer in Idaho (Hecla Mine), by W. E. Carr: Compressed Air Mag., vol. 30, pp. 1375-1379, September, 1925.


Geology and metalliferous resources of the region about Silver City, Idaho, by A. M. Piper and F. B. Laney: Idaho Bureau of Mines and Geology Bull. 11, 1926.


Geology and ore deposits of the Seafoam, Alder Creek, Little Smoky and Willow Creek districts, Custer and Camas counties, by C. P. Ross: Idaho Bureau of Mines and Geology Pamphlet 33, 1930.


MINING INDUSTRY OF IDAHO

SULPHUR
Sulphur occurring in extensive deposits and as sulphur springs is found in Caribou County. During the World War a slight attempt was made toward the commercial development of the deposits.

TALC
Talc suitable to the electrical and powdered-talc industries occurs in Idaho County in sufficient extent to be of commercial importance.

TIN
Tin has been found in the placer mines in the Gravel Range mining district of Lemhi County.

TUNGSTEN
Tungsten, in the form of scheelite and wolframite, occurs in commercial value in Shoshone, Idaho, Camas, Lemhi, Boundary, Bonner, Blaine, Valley, and Butte counties. The deposits in Shoshone County have been extensively exploited, and during the war period of high prices a large tonnage was produced and marketed; at the same time a small amount was obtained from Boundary and Camas counties. Sufficient work has been done on all of these deposits to indicate that tungsten is one of the State's substantial mineral resources. Tungsten, cinnabar, manganese, molybdenum, and tin deposits of Idaho, by D. C. Livingston: Univ. of Idaho School of Mines Bull. 2, vol. 14, 1919.*

ZINC
Zinc is found associated with lead in many of the lead mines of Idaho, although there are numerous deposits in Shoshone and Blaine counties in which it is the principal metal. In Shoshone County it occurs as sphalerite (zinc sulphide), and in Blaine County as sphalerite and smithsonite (zinc carbonate).
Selective flotation revolutionized the art of ore-dressing, and it is now possible to treat mixed lead-zinc ores which could not be separated by gravity concentration methods. As a consequence, the zinc content which was formerly lost is recovered, and many mines which at one time could not be profitably operated are now being reopened in Blaine, Camas, and Shoshone counties. As a result of these modern ore-dressing methods, Idaho is one of the largest zinc-producing states in the Union.

The principal zinc-producing counties, in the order of prominence, are Shoshone, Blaine, Camas, Custer, Lemhi, Bonner, Boise, Boundary, and Butte.
The bibliography for those ores in which zinc is a secondary metal, will be found classified under the principal ore. Mining, milling and smelting methods will be found under the county in which the plant is located.


IDAHO MINERAL RESOURCES


Origin and distribution of ore in the Coeur d'Alene, by O. H. Hershey, published for the author as a pamphlet by the Min. and Sci. Press, 32 pp. 1916.**


Geology and ore deposits of the Mackay region, Idaho, by J. B. Umpleby: U. S. Geol. Survey Prof. Paper 97, 1917.‡

A reconnaissance of the Pine Creek district, Idaho, by E. L. Jones, Jr.: U. S. Geol. Survey Bull. 710, pp. 1-36, 1919.‡


Geology and ore deposits of Boundary County, Idaho, by V. R. D. Kirkham and E. W. Ellis: Idaho Bureau of Mines and Geology Bull. 10, 1926.**


Sequence of ore deposition in north Idaho, by A. L. Anderson: Econ. Geology, vol. 25, pp. 160-175, March-April, 1930.**


Geology and ore deposits of the Seafoam, Alder Creek, Little Smoky and Willow Creek districts, Custer and Camas counties, by C. P. Ross: Idaho Bureau of Mines and Geology Pamphlet 33, 1930.*

NAMES, ADDRESSES, ABBREVIATIONS AND SYMBOLS USED IN BIBLIOGRAPHIES

Am. Geology..................................................American Geology†
Am. Inst. Min. Eng. Trans..........................American Institute of Mining and
Metallurgical Engineers Transactions, 29 West 39th St., New York City
Am. Jour. Sci..................................................American Journal of Science
Tuttle, Morehouse & Taylor Co., 123 Temple St., New Haven, Conn.
Am. Mineralogist..............................................American Mineralogist
Princeton, N. J.
California Jour. Tech..................................California Journal of Technology
University of California, Berkeley, Calif.
Ottawa, Canada
Canadian Min. Inst. Jour...............................Canadian Mining Institute Journal
Drummond Bldg., Montreal, Quebec, Canada
Columbia School of Mines Quart................Columbia School of Mines Quarterly
Columbia University, New York City
Compressed Air Mag.................................Compressed Air Magazine
Bowling Green Bldg., 11 Broadway, New York City
Econ. Geology..................................................Economic Geology
University of Illinois, Urbana, Ill.
Eng. and Min. Jour........................................Engineering and Mining Journal
Tenth Ave. & 36th St., New York City
Eng. and Min. Jour.-Press............................Engineering and Mining Journal-Press†
Franklin Inst. Jour........................................Franklin Institute Journal
15 South 7th St., Philadelphia, Pa.
Geol. Soc. America..................................Geological Society of America
Museum of Natural History, Columbus Ave. & 77th St., New York City
Inspector of Mines, Boise, Idaho
Idaho Bureau of Mines and Geology, Moscow, Idaho
Int. Min. Cong. Proc..............................Proceedings International Mining Congress
International Mining Congress, Washington, D. C.
Jour. Geology..................................................Journal of Geology
University of Chicago Press, Chicago, Ill.
Mines and Minerals.................................Mines and Minerals†
Min. Con. Jour..............................................Mining Congress Journal
American Mining Congress, 841 Munsey Bldg., Washington, D. C.
Min. and Eng. World...............................Mining and Engineering World†
Mining and Metallurgy
American Institute of Mining and Metallurgical Engineers, Inc.
29 West 39th St., New York City
Min. Mag.......................................................Mining Magazine†
Min. Reporter............................................Mining Reporter†
Min. and Sci. Press.................................Mining and Scientific Press†
Min. World..................................................Mining World†
Nat. Geog. Mag...........................................National Geographic Magazine
National Geographic Magazine Society, Hubbard Memorial Hall,
Washington, D. C.
New York Acad. Sci. Trans........................New York Academy of Science Transactions
New York Academy of Science, New York City
No. .................................................................Number
Northwest Min. News.................................Northwest Mining News†
Northwest Science, Spokane, Wash.
Pacific Miner................................................Pacific Miner†
P., PP.......................................................Page, pages
Pan-Am. Geologist.................................Pan-American Geologist, Des Moines, Iowa
pt ..............................................................Part
Salt Lake Min. Review...................................Mining Review
Walker Bank Bldg., Salt Lake City, Utah
ABBREVIATIONS AND SYMBOLS

Sci. Am. Suppl..........................Scientific American Supplement
New York City

ser. .......................................................... series
sess. .......................................................... session
U.S. Geol. and Geog. Survey ..........U.S. Geological and Geographical Survey†
Univ. of Idaho ....................................University of Idaho, Moscow, Idaho
vol. .......................................................... volume
211 Church St., Easton, Pa.

SYMBOLS

*—Available in libraries only. Publication out of print.
**—Can be procured from publisher.
§—Not available for general distribution; may possibly be procured from publisher. (Also section reference in law citations.)
†—Can be purchased from Superintendent of Documents, Government Printing Office, Washington, D.C.
††—Publication suspended.
∥—Address: Washington, D.C.
GEOLOGICAL DIAGRAM.
ILLUSTRATING THE GENERALIZED DISTRIBUTION
OF THE
PRINCIPAL IDAHO FORMATIONS

LEGEND
- County Seats
- Custer-Etc. Names of counties
--- County Boundary Lines.

- Recent Lake Bed Sediments
- Tertiary
- Tertiary Lava's Largely Soil Covered
- Cretaceous Coal Bearing Series
- Triassic Jurassic And Carboniferous
- Carboniferous Series
- Quartzite Slates And Graywackes.
- Granite Gneiss And Schist.
ADA COUNTY

County Seat: Boise. Area: 1,154 square miles. Population: 37,925. Principal Industries: Irrigated farming, stock raising, fruit raising and mining. Highways: Main highway, Oregon Trail; county roads excellent. Railroads: Main line of the Union Pacific. Mineral Resources: Boise was the principal distributing point for miners' supplies when the rich placer diggings of Boise County were worked in the early days. At that time mining was based on free gold operations and Ada County's small mountainous area was the scene of many active operations.

Base ore was encountered at a shallow depth causing a shutdown of the various properties. This field offers good opportunities to prospector and operator.

The chief mineral resources are: building stone, gold, lead, silver, zinc and arsenic.

Review of Year's Operations

The 10-stamp mill at the Black Hornet Mine of the American Rand Mines Company was overhauled. Considerable testing was done and some concentrates produced.

Thirty feet of tunnel was extended at the Shirley Gold Mining Company. Prospecting was active in this district during the year.

Operations along the Snake River were quite successful and several new washing plants were built.

The Gold Flour Mining Company mined a three-foot pay streak that ran from one to four dollars a yard and handled about 90 yards daily.

P. J. McHugh, Chas. Ryberg, A. E. Cox, Ed Delain and Bill Meighan are the owners. Nine men are employed in operating this plant.

ASSOCIATED GOLD PRODUCERS, INCORPORATED


BERGDAHL OIL CO.


BOISE MINING, MILLING & SMELTING CO.


NAMPA GOLD DREDGING CORPORATION


RELECES-GOLD MINING CO.

SHIRLEY GOLD MINING CORP.  

<table>
<thead>
<tr>
<th>NAME OF MINE</th>
<th>MINING DIST.</th>
<th>OWNER</th>
<th>P. O. ADDRESS</th>
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<tr>
<td>Big Foot Bar</td>
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<td>Archie T. Winter</td>
<td>Mt. Home</td>
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<td>Goodwin &amp; Thacker</td>
<td>Boise</td>
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<td>A. G. Adelman</td>
<td>622 Idaho St., Boise</td>
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<td>J. M. Roberts</td>
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<td>C. C. Anderson</td>
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<td>Boise</td>
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<td>H. J. Leppert</td>
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</table>

BIBLIOGRAPHY

See pages 102-103 for publisher's address, meaning of reference marks, and abbreviations.


Geology and water resources of the Snake River Plains of Idaho, by I. C. Russell: U. S. Geol. Survey Bull. 199, **1902.**

Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon, by I. C. Russell: U. S. Geol. Survey Water-Supply Paper 78, **1903.**

Notes on the geology of southwestern Idaho and southeastern Oregon, by I. C. Russell: U. S. Geol. Survey Bull. 217, **1903.**

Description of the Nampa quadrangle, by Waldemar Lindgren and N. F. Drake: U. S. Geol. Survey Geol. Atlas, Folio No. 103, **1904.**

Description of the Silver City quadrangle, by Waldemar Lindgren and N. F. Drake: U. S. Geol. Survey Geol. Atlas, Folio No. 104, **1904.**

Mineralogy of some black sands from Idaho, with a description of the methods used for their study, by E. V. Shannon: U. S. Nat. Mus. Proc., vol. 60, art. 3, pp. 1-33, **1921.**

A preliminary reconnaissance of the gas and oil possibilities of southwestern and south-central Idaho, by J. P. Buwalda: Idaho Bureau of Mines and Geology Pamphlet 5, **1923.**

ADAMS COUNTY

County Seat: Council. Area: 1,366 square miles. Population: 2,867. Principal Industries: Agriculture, fruit raising, live stock raising, and mining. Highways: North and South Highway. Branch roads to outlying communities kept in good condition. Railroads: Pacific and Idaho Northern, Weiser to New Meadows and Oregon Short Line branch on Snake River. Rivers: Snake River forms western boundary; Weiser River flowing south and Little Salmon flowing north. Relief: 90% of the county is mountainous. Chief range is the Seven Devils, noted for ruggedness and grandeur. Mineral Resources: In the eighties and early nineties many mines were in operation; a railroad projected into the district; a smelter in operation and three towns established. The boom died in the panic of 1893 and the district has been practically dormant since.

The ores of the Seven Devils District are principally copper-gold-silver ores. The ores of Indian Creek section are: silver-copper and lead-zinc-silver. In addition to these, deposits of mica, feldspar and garnets of commercial importance occur in this county.

This is a favorable district for the prospector and operator and when the mineral resources are properly exploited, the county will be recognized as one of the principal mining counties of the State.

Review of Year's Operations

Most of the mining in Adams County was confined to activity on Cuddy Mountain and in Placer Basin. Prospecting, testing, assessment work and shipments of ore were made from these districts.

A mill was built on the Placer Basin Company ground by H. B. Honeyman, Jr., of Portland, Oregon, to be known as the Smith Mountain Mill. This mill will handle Placer Basin ore under contract. Concentrates are shipped via Cuprum and Homestead.

Properties of merit are located in the Seven Devils district that are worthy of investigation by scouts and field parties. Large deposits of copper ores with better than a trace of gold in their content are known and have been diamond drilled to some extent.

BLACK HORSE GROUP

CRACKERJACK GOLD MINING COMPANY

GOLD COIN MINING & DEVELOPMENT CO.
IDAHO COPPER CORPORATION


PLACER BASIN COMPANY


RED LEDGE, INC.


TRIAD MINING COMPANY


NAME OF MINE  MINING DIST.  OWNER  P. O. ADDRESS
Alaska et al  Seven Devils  Mrs. S. J. Stephens  Cuprum
Amadore et al.  Seven Devils  Mrs. Anna Dimick  San Antonio, Texas
American Flag et al.  Mountain View  Mary Z. Finney  Cleveland, Ohio
Andy O'Toole Gr.  Seven Devils  L. A. Aplington  Homestead, Ore.
Araknsaw  Seven Devils  E. C. Westervelt  11 Broadway, New York City, N. Y.
Azurite Gr.  Seven Devils  John Bottcher  Tacoma, Wash.
Bald Eagle  Seven Devils  Mrs. Mabel Sprouls  Cuprum
Big Indian et al.  Seven Devils  Loren Gogochea  Ontario, Ore.
Black Garnet  Seven Devils  Ellen Kleinschmidt  Berkeley, Calif.
Black Hawk Gr.  Seven Devils  E. C. Spicer  Homestead, Ore.
Blue Bird Gr.  Seven Devils  Mose Fuchs  Baker, Ore.
Blue Bucket  Seven Devils  Irene Imhaus  Madison Park Apt., Portlond, Ore.
Bryan et al.  Seven Devils  Mose Fuchs  Baker, Ore.
Camp Ground et al.  Seven Devils  Martin Bradley  Cuprum
Chameleon Gr.  Mountain View  Thos. G. Potter  Pollock
Chieftain et al.  Seven Devils  Jas. A. Stewart  Indian Valley
Cliff et al.  Seven Devils  Mrs. P. L. Gaarden  Bear
Copper Belt Gr.  Seven Devils  G. W. McCarty  Homestead, Ore.
Copper Bottom  Seven Devils  Frank Shelton  Cuprum
Copper Queen et al.  Unorganized  Lynn Snow  Newburg, Ore.
Decorah  Seven Devils  R. E. Wilson  Cambridge
Decorah  Seven Devils  Mary Steele  1516 S. Negley Ave., Pittsburgh, Pa.
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**BIBLIOGRAPHY**

See pages 102-103 for publisher's address, meaning of reference marks, and abbreviations


The Seven Devils and the Snake River district by G. D. Reid: Eng. and Min. Jour., vol. 84, p. 401, Aug. 31, 1907.§

BANNOCK COUNTY

Principal Industries: Distributing center, R. R. division and shops. Highways: Oregon Trail and Yellowstone Park highway; excellent branch roads. Railroads: Oregon Short Line, shops and division headquarters in Pocatello. Mineral Resources: Phosphate rock, limestone, manganese, copper, silver, gold and building stone. The limestone is suitable for cement and the phosphate rock for fertilizer. Manganese deposits near Cleveland and Lava Hot Springs were discovered in 1924 and reports indicate that there is a large tonnage of high grade ore available.

Review of Year's Operations

The Idaho Portland Cement Company, located at Inkom, employed an average of 50 men in the manufacture of “Eagle Brand” cement. This product is in demand and it was reported that the company enjoyed a satisfactory business during the year 1936.

CHATTERTON MINING CO.

EMERALD OIL & GAS CO.

IDAHO PORTLAND CEMENT CO.

LEAD BELL MINING CO.
BIBLIOGRAPHY
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Geography, geology, and mineral resources of the Fort Hall Indian Reservation, Idaho, by G. R. Mansfield: U. S. Geol. Survey Bull. 713, 1920.‡


Triassic and Jurassic formations in southeastern Idaho and neighboring regions, by G. R. Mansfield: Am. Jour. Sci., vol. 50, pp. 53-64, July, 1920.§

Geography, geology, and mineral resources of part of southeastern Idaho, by G. R. Mansfield: U. S. Geol. Survey Prof. Paper 152, 1927.‡


BEAR LAKE COUNTY

County Seat: Paris. Area: 980 sq. miles. Population: 7,872. Principal Industries: Agriculture. Highways: Oregon Trail and excellent branch roads. Railroads: Main line of Oregon Short Line. Mineral resources: Phosphate rock, gypsum, manganese, copper, lead, silver and possibilities of petroleum. Idaho is credited with 85% of the known phosphate resources of the world and the largest and most accessible areas are in Bear Lake County. These deposits are practically untouched and represent one of the greatest potential resources of the state. (See U. S. G. S. Professional Paper No. 152 by G. R. Mansfield.) Many structures similar to the Wyoming producing oil fields are found in the county and it is reasonable to expect future production on the Idaho side of the State line.

Review of Year’s Operations

Mining in Bear Lake County during the year 1936 was practically dormant with the exception of some assessment work, restaking of claims and interest shown in the development of the vast phosphate deposits in this section of the State.

PARIS MINING AND MILLING CO., INC.


SAN FRANCISCO CHEMICAL CO.

SOLAR DEVELOPMENT CO., LTD.

STOCKHOLDERS' SYNDICATE

SUNSET MINING CO.

BIBLIOGRAPHY
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Lake Bonneville, by G. K. Gilbert: U. S. Geol. Survey Mon. 1, 1890.*
Geol. of the copper deposits near Montpelier, Bear Lake County, Idaho, by H. S. Gale: U. S. Geol. Survey Bull. 430, pp. 112-121, 1909.*


BENEWAH COUNTY

County Seat: St. Maries. Area: 786 sq. miles. Population: 6371. Principal Industries: Timbering, agriculture and mining. Transportation: Boats on Coeur d'Alene Lake and St. Joe River; a good state highway system; Spokane-Wallace branch of the O. W. R. & N. Co. and main line of Chicago, Milwaukkee and St. Paul Railroad. Rivers and Lakes: St. Maries River which runs northwest through the eastern part of the county empties into the St. Joe River which flows west through the northern parts of the county and empties into Lake Coeur d'Alene, whose southern end touches the north boundary of the county. Relief: The county is rugged and heavily timbered except a small area along the rivers and in the northwest corner of the county. Mineral Resources: The principal mineral resources are gold, copper, silver, lead, zinc, iron and clay. These deposits have been given very little attention in the past. The St. Joe district which lies east of St. Maries, and the Hoodoo and Camas Cove Districts in the southeastern corner of the county have received the greatest attention.

Review of Year's Operations

Most of the properties in Benewah were idle during 1936. Some prospecting and annual labor was performed while many claim holders took advantage of exemption privileges extended by Congress for the past year.

BUTTE MINING CO.


OTHELLO MINING CO.

RAINBOW MINING & MILLING CO., LTD. (See Shoshone and Kootenai counties).
Office: S. 106 Madison St., Spokane, Wash. Officers: Geo. Austin, Pres.-Mgr., E. H. Polworth, Sec.-Treas., both of Spokane, Wash. Inc.: June 20, 1907. Capital: 1,200,000 shares; par value 25c; increased July 25, 1913, to 2,000,000 shares; par value 25c; changed Jan. 16, 1931, to 1,108,998 shares preferred; 891,002 shares common; par value 25c; changed Feb. 21, 1931, by increasing the par value of 381,229 shares of preferred stock from 25c to $1 per share. Issued: 727,769 shares preferred; par value 25c; 392,914 shares preferred, par value $1; 891,002 shares common. Property: Rainbow No. 3 group; 14 patented and 5 unpatented claims; Medimont dist. Development: 3120 ft. of tunnels; 3000 ft. of diamond drilling. Plant: Modern camp, necessary mine equipment to carry development program to completion. Ore: Lead-silver. Men Employed: Average, 6. Remarks: 513 ft. of development work.

ROUND TOP MINING CO.

SILVER STAR MINING & DEVELOPMENT CO.

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<td>C. A. McLean</td>
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MINING INDUSTRY OF IDAHO

Composition and origin of certain commercial clays of northern Idaho, by Edward L. Tullis and F. B. Laney, vol. 28, No. 5, Econ. Geol., 1933.

BINGHAM COUNTY

County Seat: Blackfoot. Area: 2184 sq. miles. Population: 18,561. Principal Industries: Agriculture. Transportation: An excellent system of state highways; Aberdeen, Mackay and Pocatello-Butte branches of the Oregon Short Line. Rivers: The Snake River flows from the northeast to the southwest diagonally through the country. Relief: Lies mostly within the Snake River Valley. Mineral Resources: Phosphate and coal beds crop out in the eastern part of the country but have received little attention. Fine gold is known to exist in the sands of Snake River.

Review of Year’s Operations

Very little mining of any kind in this county with the exception of some prospecting along the Snake River. No new discovery of importance was reported.

NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
---|---|---|---
Eagle Bend Pl. | Snake River | Alma Clough | Pingree
Eldorado Placer | Snake River | Robert Wheeler | Sterling
Oborn & Coler Pl. | Snake River | John Oborn | Blackfoot
Parsons Placer | Snake River | G. W. Parsons | Aberdeen
Snake River Pl. | Snake River | G. E. Campbell | Blackfoot
Woodruff Bend Pl. | Snake River | James G. Walsh | Blackfoot

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See pages 102-103 for publisher’s address, meaning of reference marks, and abbreviations

Geology and ore deposits of the Mackay region, Idaho, by J. B. Umpleby: U. S. Geol. Survey Prof. Paper 97, 1917.†
Geography, geology, and mineral resources of the Fort Hall Indian Reservation, Idaho, by G. R. Mansfield: U. S. Geol. Survey Bull. 713, 1920.†
Mineralogy of some black sands from Idaho, with a description of the methods used for their study, by E. V. Shannon: U. S. Nat. Mus. Proc., vol. 60, art. 3, pp. 1-33, 1921.‡
Geology and oil possibilities of Bingham, Bonneville, and Caribou counties, Idaho, by V. R. D. Kirkham: Idaho Bureau of Mines and Geology Bull. 8, 1924.**
Geography, geology, and mineral resources of part of southeastern Idaho, by G. R. Mansfield: U. S. Geol. Survey Prof. Paper 152, 1927.‡
BLAINE COUNTY

County Seat: Hailey. Area: 2797 sq. miles. Population: 3768. Principal Industries: Mining, animal raising and agriculture. Transportation: O. S. L. Wood River branch; Sawtooth Park state highway, state highway No. 22 and a fair system of county roads into all mining districts. Main roads kept open all year. Rivers: Big and Little Wood rivers flow southerly through the county. Relief: The county is, in the main, rugged with a few level areas along the rivers and creeks. Elevation from 4500 ft. in the southern part to Hyndman Peak in the Sawtooth Mountains, elevation 12,078 ft., the highest point in Idaho. Mineral Resources: Silver, lead, gold, zinc, copper, arsenic, antimony, bismuth, quicksilver, graphite, barytes and limestone. The first ore was shipped from this district in 1880 and since then the country has been a persistent and prolific producer.

The ores are high grade, making an ideal operation for the small operator. The possibilities for future discoveries are excellent and the district is a favorable one for prospectors, development companies and lesors.

Review of Year's Operations

Stratton & Stratton carried on an extensive exploration program in an effort to solve the faulting problem at the Minnie Moore Mine. This property at one time was one of the leading silver producers in the State. Twelve men are employed.

A three-year lease was obtained on the Idaho-Philadelphia on the West Fork of Warm Springs Creek. Some activity was noticeable. The values are in silver-carbonate.

The Golden Glow Mine on Boulder Mountain, 20 miles northwest of Ketchum, was reopened by Canadian capital. J. A. Shultz of Ketchum supervised the work. Russell Cone, the engineer, is in charge of development work.

The Snyder Mines, Inc., worked a crew of 150 men at its Hailey-Triumph property. This is the largest operation in Blaine County. The North Star Mine was taken over and connected up with the Hailey-Triumph property. It is reported that this company is shipping about 215 tons of ore daily over a four and one-half mile tramway to the railroad. Facilities at the mine can accommodate only 75 men. Neil Snyder is in charge of operations.

Activity was noticed on properties between Hailey and Ketchum and on placer ground from Ketchum toward the Trail Creek Summit, while prospecting was evident in the vicinity of Galena Summit on the way to the Stanley Basin.

Gus Anderson, Ketchum, is mining on the North Fork of Wood River and has uncovered a good showing on his property. Frank Friehof has made shipments of high grade ore from adjoining claims.

Rock to finish Sun Valley Lodge was quarried on Rock Creek near Hailey. This resort cost the Union Pacific Railroad Company nearly $1,500,000.

Koontz & Cook made some shipments from the Cook property between Hailey and Fairfield.

ARGOSY MINING & MILLING CO., LTD.

BALTIMORE & VICTORIA MINING CO.
BLACKJACK MINES CORPORATION

BOULDER BASIN MINES, INC.

ERVINE MINING CO.

EUREKA DEVELOPMENT CO., LTD.

FEDERAL MINING & SMELTING CO. (See Shoshone County)
Office: Wallace. Officers: F. H. Brownell, Pres.; J. L. Martin, Sec., both of 120 Broadway, New York City; H. G. Washburn, Mgr., Wallace. Property: Independence, North Star, Koening, and Malta groups; 45 patented, 4 unpatented claims, 762 acres, Warm Springs Creek dist.; Hailey, 12 miles. Development: Approximately 10 miles of underground workings, the principal of which is the Plummer, or main haulage tunnel, which is over 6000 ft. long and connects the North Star and Independence groups. Plant: MINE: 1 English Iron Works 202 single-drum 25 h.p. electric hoist; 1 Lidgerwood 8x10 air hoist; 1 I-R 420 cu. ft. compressor; 1 C-P 765 cu. ft. compressor; all electrically driven; electric haulage through Plummer tunnel; one Waugh drill sharpener and complete mine equipment; 4400 ft. Riblet aerial tram from Plummer tunnel to mill, capacity 20 tons an hour; shops, timber sheds, and bunk houses. MILL: 500-ton concentrator; jaw and gyratory crushers; rolls; Marcy ball mills; Hancock jigs; drag classifiers; Wilfley tables; Dorr thickeners; Oliver filters; electric power. Ore: Silver-lead. Remarks: Some work by lessees.

FIELDS MUTUAL DEVELOPMENT CO.
HAILEY TRAMWAY CO.

HAILEY TRIUMPH MINES CO.

HOMESTAKE MINES CORPORATION
Office: Ketchum. Officers: H. L. Kaufman, Pres.-Mgr., Ketchum; A. J. Anderson, Sec., Seattle, Wash. Inc.: July 27, 1927. Capital: 1000 shares, par value $100; increased Oct. 30, 1931, to 1,000,000 shares, par value $1; 400,000 shares issued. Property: Homestake group; 1 patented, 12 unpatented claims, Warm Springs Creek dist.; Ketchum. Development: Approximately 6000 cu. ft. of workings, the principal tunnels being: No. 3 tunnel, 500 ft. long; No. 4 tunnel, 800 ft. long; No. 5 tunnel, 1500 ft. long; No. 6 tunnel, 1895 ft. long. Plant: Gas-driven C-P compressor; complete mining equipment and camp. Ore: Lead-silver-zinc.

IDAHO MINERAL PRODUCTS CO.

IVANHOE MINING CO. (See Custer County)

JENNIE R. MINING CO.

LIBERTY GEM MINES, INC.
THE MINT, INCORPORATED

MONEY METALS INCORPORATED

NEW OVERLAND MINING COMPANY

RED LARK MINING COMPANY

SILVER SPAR MINING CO.

SILVER STAR-QUEENS MINES, INC.

TANTAMOUNT MINING COMPANY
TIP TOP GROUP MINING CO.

UNITED MINES CO. OF IDAHO, INC.

UTAH-BELLEVUE MINES CO.

WOOD RIVER MINING CO.

NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
--- | --- | --- | ---
Ajax | Mineral Hill | Leo Barrett | Hailey
Alabama | Little Wood R. | Joe Longono | Muldoon
Alexander | Warm Spgs. Cr. | Oscar Griffith | Ketchum
Alturas & Scotia | Sawtooth | Frank Becker | Hailey
Amazon | Mineral Hill | Chas. R. Walters | Shoshone
Anabelle | Mineral Hill | Sibbie Tandy | Hailey
Anna | Mineral Hill | Mrs. P. McMonigle | Hailey
Anna et al. | Warm Spgs. Cr. | Frank Langell | Hailey
Bald Eagle | Mineral Hill | Cecelia J. Thomas | Hailey
Barbara | Mineral Hill | John Utsch | Hailey
Battling Jack Gr. | Sawtooth | John F. Garrett | Obsidian
Bavarian | Mineral Hill | H. J. Vorberg | Hailey
Beaver Gr. | Sawtooth | Thos. Mizer Est. | Hailey
Belmont Gr. | Mineral Hill | Jos. Siker | Hailey
Big Mint | Mineral Hill | H. R. Plughoff Est. | Hailey
Black Barb | Mineral Hill | Mrs. Cecelia Roark | Boise
Black Diamond | Warm Spgs. Cr. | Magnolia Gutch | Hailey
Black Horse | Mineral Hill | Mrs. Cecelia Roark | Bellevue
Blue Bell | Warm Spgs. Cr. | Augustine Johnson | Hailey
Bob Tail | Mineral Hill | Rodney Brown Est. | Hailey
Bonanza | Mineral Hill | J. L. Van Over | Bellevue
Boulder Gr. | Warm Spgs. Cr. | M. W. Wood | Boise
Boyle Mt. Gr. | Warm Spgs. Cr. | C. Fred Howe | Ketchum
Broadway | Warm Spgs. Cr. | Fred Vancil | Hailey
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NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
---|---|---|---
Star | Mineral Hill | Leo J. Falk | Boise
Stockholder | Mineral Hill | Ira L. Kilgore | Hailey
Sunrise Gr. | Warm Spgs. Cr. | R. J. Blakeley | Hailey
Surprise | Little Wood R. | F. J. Long | Wendell
Susie S. | Mineral Hill | John Hailey Est. | Boise
Tiger | Mineral Hill | Guy U. Lee | Hailey
Tiger Frac. | Mineral Hill | Fred Reinhard | Hailey
Tom Cat | Mineral Hill | Chas. Sonneleitner | Hailey
Triumph et al. | Warm Spgs. Cr. | M. W. Wood | Boise
Tungad | Mineral Hill | Peter L. Kent | Hailey
Vindicator Gr. | Warm Spgs. Cr. | Archie Bell | Ketchum
Wheelbarrow | Warm Spgs. Cr. | A. T. Farnlund | Ketchum
White Elephant | Warm Springs | Jas. Obenchain | Carey
White Wing | Unorganized | C. C. Starcher | Boise
Wolfstone | Mineral Hill | W. T. Riley | Hailey
Wonder Gr. | Mineral Hill | Robert Justus | St. Louis, Mo.
Wood River Pride | Mineral Hill | Alice Holland | Bellevue
Woodrow Gr. | Mineral Hill | V. T. Clark | Ketchum
Woodrow Wilson | Warm Spgs. Cr. | M. A. Morris | Ketchum

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See pages 102-103 for publisher's address, meaning of reference marks, and abbreviations


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BOISE COUNTY

County Seat: Idaho City. Area: 1840 sq. miles. Population: 1847. Principal Industries: Mining, stock raising and lumbering. Transportation: Well served by Federal and State highways and a good system of county roads. The Nampa-McCall branch of the O. S. L. serves the western part. Rivers: Included within its area is part of the drainage basin of the Payette River, most of the south fork of the Payette River and all of the drainage basins of Grimes and Moore's creek which comprise the area known as the Boise Basin. Relief: The district is one of general ruggedness, high wooded mountains and deep canyons. Mineral Resources: Gold, silver, lead, zinc, copper, bismuth, antimony, monazite, lime and coal are known to occur.

History and Future

The history and future of Boise County dates back to the formation of the State in 1860, when placer gold was first discovered near Pierce City (Clearywater County). The overflow from this stampede resulted in the discoveries at Elk City, Florence, and Boise Basin, in quick succession, and by 1863 Boise Basin was one of the most thriving communities in the western part of the United States. In July, 1864, more than nine thousand 20-acre placer claims had been recorded in the three principal mining districts.

During the first few years after the discovery of gold all mining was confined to the placers which were susceptible to hand methods. After these became less profitable, numerous ditches 5 to 30 miles in length were constructed, and hydraulic mining of the higher bench gravels was started. These operations were conducted for many years, and a few have survived to the present day.

Shortly after the placer rush had subsided, attention was given to quartz mining; many discoveries soon were made, mills were constructed, and deep mining was started. The principal discovery was the Gold Hill mine at Quartzburg. In 1863 the vein was exposed by placer mining, and by 1867 a mill had been built and was in operation. Except at brief periods when it was being repaired, the mill was operated continuously for 12 years. The mine has been in almost continuous operation since the day of discovery and is credited with a production of six to eight million dollars. The record gives it the distinction of being the oldest and largest producing gold mine in the State. The vein has been opened to a vertical depth of 1090 feet below the creek level; at this point the ore is still persistent and has greatly increased both in grade and extent, and there appears to be no reason why it should not continue deeper.

In addition to the Gold Hill, many other gold mines have a large production record. This production, combined with that derived from placer mining, both hydraulic and dredging, held Boise County in first place in gold production in the State until the year 1923, and it regained this position in 1928. The opening of the ore bodies on the 1090-foot level of the Gold Hill mine, the past production from the Belshazzar mine, and the new ore disclosures made during 1932 were instrumental in attracting much attention to the county.
As the early-day miner was interested only in the precious metals, gold and silver, which could be recovered by the methods then in use, he disregarded all veins containing the sulphide or base ores. Before these ores became valuable, prospecting had practically ceased, with the result that this county offers one of the best fields in the State to prospectors or small development companies in search of lead-zinc-silver ores. Deposits of these metals, which contain also high values in gold, are widely distributed throughout the county, and a few have been partly developed. When properly exploited and intelligently managed, they will become an important factor in the future prosperity of Boise County and the City of Boise and will give the State an additional lead-zinc producing district.

Review of Year's Operations

The Idaho Placer, at Idaho City, is the largest hydraulic placer in Idaho. Two giants are in use and the Earl C. Anthony Company employs a crew of 20 men as long as the water holds out at the property.

Four dredges were in operation with a combined digging capacity of approximately 18,000 yards every 24 hours.

Idaho Gold Dredging Company operated the largest dredge in the State near Centerville. This boat has a digging capacity of 6000 yards daily. The Fisher and Baumhoff interests also moved from Warren a smaller dredge which is now operating on Granite Creek near Placerville.

The Grimes Company dredge at Pioneerville operated throughout the year and enjoyed a very successful season.

Below Idaho City on Moore's Creek the Moore's Creek Dredging Company operated a new boat on property secured under lease and bond from the Idaho Gold Dredging Company. Some difficulty was encountered during high water but the operation of this dredge during 1936 was a marked success.

The Granite Creek Dredging Company, W. L. Smith, president and manager, moved its dragline, washing plant and other equipment to ground acquired by the company in the Florence district.

High gold values are reported from the Hay Fork, a tributary of Moore's Creek. H. R. Jarvis employs a crew of six men at his property and considerable activity was noticed at other holdings.

Twelve men were employed by the Boise Basin Placer Corporation. G. P. Williams is president, and J. L. Mercer is manager. Camp buildings are built on wheels, making the outfit entirely portable. Overburden is moved by hydraulic and the pay dirt is handled by drag line to the washing plant. The ground was acquired from S. K. Atkinson of Boise.

The Washington Mine was rehabilitated by the Consolidated Mines Syndicate, Frank E. Johnesse, 623-25 First National Bank Building, Boise, president. Over 50,000 tons asserted to run good values in silver with a fair gold content have been blocked out. Development includes two and one-half miles of underground work including a 3700-foot tunnel. Plans call for the building of a 50-ton mill.

John Murnan and Fred Brassey leased at the Mountain Chief which is on the same vein system as the Belshazzar. It is reported that some Minneapolis people are interested and plan to open up the Belshazzar. This property produced high grade gold ore in years past.

The Mayflower mine in the Quartzburg district has been acquired by the Texas-Owyhee Mining and Development Company from J. B. Eldridge of Boise. This property comprises two patented and seven unpatented claims located between the Gold Hill Mine of the Talache Mines Corporation and the Belshazzar. The Mayflower is electrically equipped and has a complete flotation concentration plant capable of handling around 40 tons daily. A new hoist has just been installed. Between 20 and 30 men are employed. Concentrates are being shipped to Salt Lake City, Utah.

Seventy-five men are employed by Talache Mines, Inc., in its Gold Hill and Iowa Mine at Quartzburg. By means of square set and fill methods, from 100 to 125 tons of ore are being removed on the 900 and 1100-foot levels, all of which is free milling. Veins run from five to 20 feet in width. Cost of
mining and milling is estimated at $4.50 per ton, 90 per cent of the gold content being recovered in the milling plant and shipped as bullion to the mint. During the year the shaft was sunk to provide for development at a lower horizon and a sump. An exit tunnel from the 900 level is under way. This is the largest mining operation in Boise County and one of the State's leading gold producers.

A 25-ton mill is being constructed by the Cloverleaf Metals Company operating in the Elk Creek district near Idaho City. Thirty men are employed. William W. Elmer, consulting engineer, of Portland, Oregon, is in charge, assisted by his son, William W. Elmer, Jr.

A three-foot vein of free milling gold ore is stated to have been opened by the Gold Eagle Mining Company, C. R. Clendenning, Box 722, Boise, Idaho, president and manager. The ore is being sent to Mellor and Proffer's mill for treatment. Values are said to improve with depth, although the extent of the ore body has not been determined.

The Come-Back Mine made several shipments of high grade silver-gold ore. This property is worked by lessees on a royalty basis. Joseph Gornick is president of the company.

A. C. Gallupe and C. C. Fairchilds of Centerville are interested in a number of properties, including Mineral Mining Co. and other holdings.

Considerable activity was in evidence near Grimes Pass where the Bruiser, Babies, Mountain Queen and other properties are located.

The Twin Sisters mill was in operation during the year.

Work progressed at the Ox-Bow placers near Lowman.

The Birthday Consolidated Gold Mines Company, 14 miles above Lowman was reorganized during the winter. The lowest crosscut tunnel was extended.

Albert S. Holcombe, president of Idaho Modoc Placer Mining Company, supervised digging two miles of ditch and erection of five buildings on his property. The claims are hydraulic placer, located about 10 miles down Grimes Creek from Centerville.

The North Hay Fork, owned and operated by C. P. Howe, Fred Green, and John Hallstrom, milled 50 tons of ore at this property in addition to development work. The net recovery was $1500.00 in gold, 860 fine. A 60-foot tunnel was extended to tap the vein 200 feet below the outcroppings.

Jack Dodson and George Young were active on the Haywire group and on Sugar Loaf Mountain. It is reported that Dodson opened up a promising ledge in Illinois Gulch, and did considerable prospecting on the tributaries of Moore's Creek.

ALANDOC MINING CO.  

BARTON & GORDON, INC.  

BLUE ROCK MINES CORPORATION  
BOISE BASIN PLACER CORPORATION
Office: Box 603, Boise. Officers: G. P. Williams, Pres.; Helen Ferguson, Sec., both of Boise. Inc.: Jan. 11, 1936. Capital: 1,000,000 shares; par value 25¢; 500,000 shares issued. Property: 3500 acres of patented ground held under lease and bond.

COME-BACK MINING CO.

CONSOLIDATED MINES SYNDICATE
(See Camas, Elmore and Idaho counties.)

CONSOLIDATED MINE & DREDGING COMPANY

CROESUS GOLD MINING CO.

CURRY DITCH PLACER MINES ASSOCIATION

THE FIRST SECURITY MINING CO.

FRANKLIN PLACER CO.
GOLDEN AGE MINING PROPERTIES, INC.

GOLDEN SEAL MINING & MILLING CO.

GOLD DREDGING & POWER CORPORATION
Officers: S. K. Atkinson, Pres.; W. A. Buis, Sec., both of Boise. Remarks: This corporation was succeeded by the Idaho Gold Dredging Corporation and the latter in turn by the Mineral Products Company, a trust. This was accomplished by an exchange of shares. The directors and shareholders are practically the same. All the property and equipment formerly belonging to this corporation is now owned by the Idaho Gold Dredging Corp. This corporation is being kept legally alive and may be used at a later date.

GOLD PRODUCTION CO., A TRUST

GRANITE CREEK DREDGING COMPANY

THE GRIMES COMPANY

HALLEY PLACER CO.

IDAHO GOLD DREDGING CORPORATION

THE IDAHO METALLIC MINING AND MILLING COMPANY
IDAHO MINING SMELTING & REFINERS INC.
Office: Boise. Officers: C. S. Klingaman, Pres.; Dr. W. H. Innis, Sec., both of Boise. Inc.: July 14, 1936. Capital: 50,000 shares; par value $1; Dec. 15, 1936, increased to 300,000 shares; 700 shares issued. Property: 8 patented claims under option to purchase. Mineral sought: Calcite. Remarks: Expect to place tram in operation, repair the buildings and install suitable machinery to turn out about 50 tons daily.

IDAHO MODOC PLACER MINING CO.

IDAWA GOLD MINING CO.

IRON DYKE MINES CO.

K. C. MINES, INC.

MASCOT MINES, INC.

MAYFLOWER GOLD MINES, INC.
MINERAL MINING CO.

MINERAL PRODUCTS COMPANY, A TRUST
Office: 617 First National Bank Bldg., Boise. Officers: S. K. Atkinson, Pres.; W. A. Buis, Sec., both of Boise. Capital: 4,000,000 non-assessable stock, par value 25c; 500,000 common stock, par value $1; 5000 preferred stock, par value $50. There is issued 882,492 shares of non-assessable common stock and 380 shares of preferred stock. Remarks: Property sold under option to The Grimes Company and is being operated by them. Dredge rebuilt by the Grimes Company and operated by them.

MISSOURI MINING CO., LTD.

MOORES CREEK DREDGING COMPANY

NATIONAL MINING & DEVELOPMENT CO.

OLD LIBERTY MINING COMPANY

ORO MINING COMPANY (Partnership)

OX-BOW GOLD MINING CORPORATION
Penn Mining Co.

Pioneer Development Co.

Pittsburgh-Idaho Hydraulic Mining Co.

Red Lode Mining Company, Inc.

Semi-Anthracite Coal Mining Co.

Talache Mines, Inc.
Office: 611 Idaho Bldg., Boise. Officers: A. H. Burroughs, Jr., Pres.-Mgr.; B. K. Burroughs, Sec., both of Boise. Inc.: Apr. 21, 1917, as Armstead Mines; name changed June 8, 1922. Capital: 1,000,000 shares common, 600,000 shares preferred; par value $1; 1,580,233 shares issued. Property: Gold Hill & Iowa mine: 19 patented and 28 unpatented claims, Quartzburg dist.; Quartzburg. Development: Principally by an 1100-ft. 3-compartment, vertical shaft with 8 intermediate levels; total development over 40,000 ft. in Gold Hill mine. Plant: MINE: 75 h. p. single drum hoist; 8x8 and 7x7 compressor; complete underground equipment and mining camp. MILL: 30-ton electrically driven amalgamation mill. Ore: Gold. Men Employed: Average, 70. Remarks: 1447 ft. of development during year.

Texas-Owyhee Mining & Development Company
BOISE COUNTY

WASHOE MINING CO.


Capital: 100,000 shares; par value $1; all shares issued. Property: Banner group; 7 patented, 15 unpatented claims, Banner dist.; Idaho City. Development: 2 tunnels, the principal one of which is 4000 ft. long. Plant: 30-ton mill, tables and flotation. Ore: Silver. Remarks: Report not filed for 1936.

NAME OF MINE MINING DIST. OWNER P. O. ADDRESS

Adonis
Alameda
Alpine Gr.
American Girl Gr.
Annie Lee
Argonne Forest
Ashcroft Pl.
Banner
Atlast
Beaver Cr. Pl.
Belmont Gr.
Big Ben
Blackbird
Blackbird et al.
Black Crook Gr.
Black Hawk
Black Jack
Blue Bird et al.
Blue Jet Pl.
Blue Grouse
Blue Ribbon Gr.
Blue Rock
Blue Stone
Boston Girl
Boulder Gr.
Boundary
Buffalo Gr.
Bull Durham Pl.
Bummer Hill
Calumet
Cash Register
Catherine
Claude Marsh
Glay Gulch
Clear Cr. Pl.
Cleopatra et al.
Climax
Cold Springs
Coon Dog
Deer Horn Pl.
Dew Drop
Dog Tooth
Eldorado Gr. Pl.
Elkhorn
Elkmout
Etta B. Gr.
Eureka Gr.
Fall Creek

Unkonwn
Unknown
Alpine
Gambrinus
West View
Gambrinus
Placeville
Banner
Unknown
Banner
Quartzburg
Centerville
Placeville
Unknown
Placeville
Dry Buck
Quartzburg
Idaho City
Placerville
Elk Horn
Dry Buck
Elk Creek
Boise River
Quartzburg
West View
Placerville
Placerville
Summit Flat
Placerville
Pioneerville
Pioneerville
Bennar
Idaho City
Pioneerville
Gambrinus
Centerville
Quartzburg
Banner
Gambrinus
Idaho City
Placerville
Gambrinus
Placerville
Idaho City
Placerville
Idaho City
107 S. 9th St., Boise

Herman Schultz
J. T. C. Harrington
Louise D. Stewart
Chas. Smith
H. Mauernheimer
H. Ashcroft
V. A. Thorn
J. F. Thompson
J. D. Demning
Chas. Driscoll &
F. Daly Est.
Frank H. Cooper
Extra Lightfoot
Anderson & Newbrand
Bincord Realty Co.
Homer Granger
Jerry Dowling
G. R. Moland
Archie R. Koppes
Thos. C. Mayne
Lee Davis
Allen B. Eaton
Henry Holsmeier
Pat. Moriarty Est.
Lee Davis
Frank Cooper
I. I. Youngblood
H. C. Granger
G. Faull
Frank H. Cooper
Pat. H. Quirk
Edward Brisbin
J. T. Blair
J. A. Adams
Skidmore &
McDonald
Chris Smith
O. F. Sibley
C. C. Fairchild
Joe Elliott
Warren J. Cooper
Allen B. Eaton
Harold Rowland
Lippencott &
Warner
R. Pappoff
Robt. S. Bunch
Mrs. P. J. Hall
Albert Elster

Boise
Boise
Boise
Horseshoe Bend
Boise
Boise
Horseshoe Bend
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Horseshoe Bend
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Horseshoe Bend
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Idaho City
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Idaho City
Boise
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<th>OWNER</th>
<th>P. O. ADDRESS</th>
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<td>V. A. Thorn</td>
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<td>Idaho City</td>
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<td>Summit Flat</td>
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<td>Barber</td>
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<td>Elmer Gettys</td>
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<td>Kentuck</td>
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<td>John Golden</td>
<td>Centerville</td>
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<td>King David and</td>
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<td>M. Marchmonte</td>
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<td>Frank Daly</td>
<td>Quartzburg</td>
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<td>Shaffer Creek</td>
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<td>New Era Gr.</td>
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<td>Mary Berry</td>
<td>701 E. Jefferson St., Boise</td>
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<td>Orofino</td>
<td>Elk horn</td>
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<td>Mary L. Bunch et al.</td>
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<td>Rock Creek</td>
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<td>James E. Fox</td>
<td>Boise</td>
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</table>
NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
--- | --- | --- | ---
Riley & Farren | Placerville | J. J. Brogan | Placerville
Riverside | South View | Robt. W. Clarke | Horseshoe Bend
Rough & Ready | Unorganized | P. S. Smith | Barber
St. Clair Gr. | Pioneerville | Damien Ader | Placerville
Saunders | Placerville | W. F. Hiatt | Placerville
Seventeen Pl. | Placerville | Lee Bunch | Boise
Seventy-four | Pioneerville | C. R. Poncia | Pioneerville
Shamrock | Summit Flat | Mrs. E. W. Barry | Boise
Silver Bell | Placerville | W. F. Hiatt | Placerville
Sniveley Pl. | Centerville | H. C. Granger | Centerville
Sourdough | Summit Flat | J. D. Smith | Idaho City
Standby Pl. | Placerville | August Michelson | Beaverton, Ore.
Stanton Gulch | Placerville | John Stanton | Placerville
Sunny Day Gr. | Alpine | E. R. Swindler | Banks
Sunrise Pl. | Placerville | Nellie T. Wood et al | Boise
Swede Gulch et al. | Pioneerville | Carlo Poncia | Centerville
Terry Gr. | Willow Creek | J. T. Blair | Centerville
Trader | Idaho City | J. H. Eggars | Idaho City
Tuxedo Pl. | Boise River | C. J. Schooler et al. | Boise
Venture | Unorganized | John Benzer | Hailey
Windfall | Pioneerville | Robt D. Aikens | Boise
Walkover | Hayfork | Fred J. Kuntz | Boise

BIBLIOGRAPHY
See pages 102-103 for publisher’s address, meaning of reference marks, and abbreviations

Mineralogy of some black sands from Idaho, with a description of the methods used for their study, by E. V. Shannon: U. S. Nat. Mus. Proc., vol. 60, art. 3, pp. 1-33, 1921.*

Geology and gold resources of Boise Basin, Boise County, Idaho, by S. M. Ballard: Idaho Bureau of Mines and Geology Bull. 9, 1924.**


** BONNER COUNTY **

County Seat: Sandpoint. Area: 1748 sq. miles. Population: 13,152. Principal Industries: Lumbering, mining, agriculture and stock raising. Transportation: Boats ply Lake Pend d’Oreille, one of the largest bodies of water in the State. Two State Highways and a system of excellent county roads reach almost every district. Three transcontinental railroads traverse the county. Mineral Resources: Silver, lead, zinc, copper and limestone.

History and Future

Mining history started with the discovery of silver ores near Lakeview in 1888. Since that time there has been a small amount of mining but the county did not attract a great deal of attention until the Talache mine on the west shore of the lake proved to be a successful operation.

This was followed by the discoveries in the vicinity of Clark Fork which have added another profitable lead and silver producing district to the State’s resources.

This county, particularly the districts around Clark Fork and on the east side of Lake Pend d’Oreille are very favorable for the prospectors, operators and investors.

Review of Year's Operations

The Opportunity Gold Mines Company broke into the old Horseshoe tunnel where some stoping was done. The company’s aim is to reopen the old Opportunity Mine in the Pend d’Oreille district. Gurine Anderson, president and A. A. Heskestad, secretary, live at Sagle.

Sixty-seven feet of development work was done at Auxer Gold Mines Company near Hope. This property needs a better road for transportation facilities. James Campbell, Hope, is president and manager.

Lawrence Consolidated Mining Company was inactive except for a small amount of development work.

Regular shipments of concentrates were sent to the smelter by the Hope Silver-Lead Mines, Inc., Albert M. Nash, Kellogg, Idaho, general manager. The company is operating the Elsie K. claims at Clark Fork and the 100-ton mill. R. L. Brainard of Kellogg is president. Values are in lead and silver.

Whitedelf Mining and Development Company, near Clark Fork, has been idle for the past four years due to the low price of metals. The 75-ton mill has been revamped and mining resumed. Values are in silver-lead. Compton I. White, Clark Fork, is president. Ivor Anderson is superintendent.

** AMALGAMATED GOLD MINING CO. **

AMERICAN EAGLE MINING CO.

AUXER GOLD MINES CO.

BIG FIVE MINING CO.

BINARCH CREEK MINING CO.

BONNER MINING CO. (not incorporated)

CAMP BIRD MINING & DEVELOPMENT CO.

CAROLINA CLAIMS, INC.

CENTENNIAL CLAIMS INC.

DEL MONTE CLAIMS, INC.
EMPIRE TUNGSTEN MINING CO.

EXPLORERS PROSPECTING CO.

FALLS CREEK MINING CO.
Office: Sandpoint. Officers: W. C. Ames, Pres.-Mgr.; W. M. Hollembaek, Sec., both of Sandpoint. Inc.: Nov. 11, 1911. Capital: 500,000 shares; par value 1c; all shares issued. Property: Hewer group; 4 patented, 7 unpatented claims, Lakeview dist.; Lakeview. Development: Principally by 1 tunnel 2200 ft. long in which is an inclined shaft 1372 ft. long; total development approximately 13,500 ft. Plant: 500 cu. ft. I-R compressor; electrically driven hoist; 75 kw. generator, driven by 100 h. p. semi-Diesel engine; complete mining equipment. MILL: 100-ton concentrator, fine grinding and flotation; driven by semi-Diesel oil engine. Ore: Silver-lead-zinc. Remarks: Mine and mill under lease to the Revlis Company of Wallace for three years, from August 1, 1935.

HOPE SILVER-LEAD MINES, INC.

IDAHO LAKEVIEW MINES CO.
Office: Trail, B. C., Canada. Officers: D. M. Drumheller, Jr., Pres., Cutbank, Mont.; E. G. Randall, Sec., Trail, B. C. Inc.: June 28, 1928. Capital: 2,100,000 shares, par value 20c; increased Nov. 23, 1929, to 2,310,000 shares; increased April 3, 1930, to 2,510,000 shares; par value 20c; 2,254,415 shares issued. Property: Honey group; 4 patented, 7 unpatented claims, Lakeview dist.; Lakeview. Development: Principally by 1 tunnel 2200 ft. long in which is an inclined shaft 1372 ft. long; total development approximately 13,500 ft. Plant: MINE: 500 cu. ft. I-R compressor; electrically driven hoist; 75 kw. generator, driven by 100 h. p. semi-Diesel engine; complete mining equipment. MILL: 100-ton concentrator, fine grinding and flotation; driven by semi-Diesel oil engine. Ore: Silver-lead-zinc. Remarks: Mine and mill under lease to the Revlis Company of Wallace for three years, from August 1, 1935.

KANIKSU MINING CO.

KEEP COOL MINING CO.

KING SOLOMON'S MINES CO.
**LAWRENCE CONSOLIDATED MINING CO.**


**LUCKY STRIKE MINING CO.**


**MILWAUKEE MINES, INC.**


**MINERVA SILVER, INC.**


**NEVADA MINES**


**OPPORTUNITY MINING CO.**


**PONDERA MINING & POWER CO.**

PRIEST RIVER MINING CO.

REGAL MINING CORPORATION

SILVER LEAF MINES CORPORATION

SILVER MOUNTAIN MINING CO.

TALACHE MINES, INC. (See Boise County.)

WHITEDELF MINING & DEVELOPMENT CO.
### WHITEDELF MINING & DEVELOPMENT CO. MILL

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<th>P. O. ADDRESS</th>
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Sequence of ore deposition in north Idaho, by A. L. Anderson: Econ. Geology, vol. 25, pp. 160-175, March-April, 1930.**

Geology and ore deposits of the Clark Fork district, by A. L. Anderson: Idaho Bureau of Mines and Geology Bull. 12, 1930.**

BONNEVILLE COUNTY


History and Future

The county was the scene of many active mining operations during the early day gold rush when placer gold was discovered on McCoy and Gray creeks in the Mt. Pisgah or Caribou districts. This activity had long since died down until the search for gold in the last few years led placer miners to again explore the creeks.

The resources most likely to provide a future mining industry for this county are petroleum and phosphate rock.

No lode mining operations were conducted during the year; however, the placer resources along McCoy's and Gray's creeks in the Mt. Pisgah district received more attention than in many years, and there was an increase in the amount of placer gold produced.

THE CALIFORNIA CO.

IDAHO CONSOLIDATED PLACER MINING CO.

IDAHO GOLD MINING CO.

NAME OF MINE MINING DIST. OWNER P. O. ADDRESS
American Placer Mt. Pisgah W. H. Stocks Gray
Anderson Bar et al. Mt. Pisgah Helmer Ronback, Agt. Gray
Oneida Gr. Mt. Pisgah Fred Brenzinger, Agt. Gray
Oneida South Mt. Pisgah Miles Schneider, Agt. Gray
Pisgah Gr. Mt. Pisgah Fred Brenzinger, Agt. Gray
Silver Bell Gr. Mt. Pisgah Fred Brenzinger, Agt. Gray
Timber Line Mt. Pisgah Leroy Layland Gray
Toway Mt. Pisgah J. C. Beatty Soda Springs
Wolfe Bar Mt. Pisgah Amos S. Clark Unknown

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Ground water for municipal supply at Idaho Falls, Idaho, by A. M. Piper and V. R. D. Kirkham: Idaho Bureau of Mines and Geology Pamphlet 16, 1926.**

Geography, geology, and mineral resources of part of southeastern Idaho, by G. R. Mansfield: U. S. Geol. Survey Prof. Paper 152, 1927.†


BOUNDARY COUNTY


History and Future

In the past a number of properties have been operated profitably and the many favorable areas make this county a favorable one for the prospector although heavy overburden and dense vegetation makes prospecting expensive.

Review of Year's Operations

American Girl Mining Company did 473 feet of development work. Three veins of silver ore are reported to have been cross-cut and machinery is to be installed to expedite further development.

The International Molybdenum Company, Floyd B. Saterlee of Sandpoint, Idaho, general manager, did 120 feet of development work during the year. It is reported that the company will install equipment for a 25-ton milling plant, including crusher, ball mill, flotation cells, concentrating tables, and an 85 h. p. Diesel power plant. The company has also ordered a tractor and road grader and contemplates completion of 11 miles of road from its property to the old Continental Mine.

Molybdenum Products Company installed crusher, ball mill, reagent feeder, filter press and steam engine. One hundred fifty feet of development work was accomplished during 1936. Z. T. Parker, president, and I. J. Parker, secretary, have offices in the Old National Bank Building, Spokane, Wash.

Golden Sceptre Mining Company employed a crew of three men to do 85 feet of development work on contract.

Idamont Lead-Zinc Mines Company did 60 feet of assessment and development work.

AMERICAN GIRL MINING CO.


CLANCY MINING CO.


GOLDEN SCEPTRE MINING CO.

IDAMONT LEAD-ZINC MINES CO.

INTERNATIONAL MOLYBDENUM CO.

LEAD CONSOLIDATED MINING CO.

LUCKY ABE MINING CO.

MOLYBDENUM PRODUCTS COMPANY

NORTH IDAHO DEVELOPMENT CO.

NAME OF MINE	MINING DIST.	OWNER	P. O. ADDRESS
Broken Shovel	Moyie-Yaak	A. E. Knittel	Bonners Ferry
Continental	Porthill	J. A. Berry	Bonners Ferry
Golden Eagle, etc.	Moyie-Yaak	Chas. Hayes	Bonners Ferry
Gopher	Moyie-Yaak	A. Klockman	Bonners Ferry
Iron Duke	Moyie-Yaak	L. M. Peters	Meadow Creek
Iron Mask	Moyie-Yaak	Arthur Zimmerman	Bonners Ferry
International	Moyie-Yaak	Joseph Varcoe	Bonners Ferry
Juniper, etc.	Moyie-Yaak	Iowa Mining Co.	Harwood, Wash.
Katie Fry	Surprise	L. V. Eberhart	Leonia
Lo Lo	Moyie-Yaak	Carl Miller	Bonners Ferry
Mammoth, etc.	Moyie-Yaak	C. D. Armstrong	Chicago, Ill.
Miners Rest	Moyie-Yaak	Joseph Daniels	Bonners Ferry
Oswego, etc.	Moyie-Yaak	F. E. Brightman	Chicago, Ill.
Sunnyside	Moyie-Yaak	J. W. Wilbur
BUTTE COUNTY

BIBLIOGRAPHY
See pages 102-103 for publisher's address, meaning of reference marks, and abbreviations


Geology of the region adjoining the western part of the international boundary, by R. A. Daly: Canada Geol. Survey Ann. Rept., vol. 14, pp. 39-51a, 1901.§


Geology and ore deposits of Boundary County, Idaho, by V. R. D. Kirkham and E. W. Ellis: Idaho Bureau of Mines and Geology Bull. 10, 1926.**

BUTTE COUNTY


Review of Year's Operations

Four men were employed by Horn Silver Consolidated Mines Company in retimbering and cleaning tunnel. Property is near Arco.

Metta Mining Co., Ltd., did annual labor only on nine unpatented claims in Hamilton district, near Howe.

BADGER MINES CO.

HORN SILVER CONSOLIDATED MINES CO.
Office: Arco. Officers: L. M. Capps, Pres.-Mgr.; M. M. Dahle, Sec., both of Arco. Inc.: Dec. 21, 1925. Capital: 100,000 shares; par value $1; Nov. 8, 1934, increased to 1,000,000 shares; par value $1; 136,044 shares issued. Property: 11 unpatented claims, 5 of which are held under lease and option, Lava Creek dist.; Martin. Development: By 2 tunnels; approximate total development, 3100 ft. Plant: Gas-driven compressor; complete mining equipment and camp. Ore: Lead-silver. Men Employed: Average 4. Remarks: Retimbering and clearing tunnel.

MAUDE ELLEN OIL CO.
METTA MINING CO., LTD.

RICHMOND DEVELOPING CO. (Not incorporated)

WILBERT MINING CO., LTD.
Office: 220 Kearns Bldg., Salt Lake City, Utah. Officers: J. A. Foley, Pres.-Mgr.; T. L. Mitchell, Sec., both of Salt Lake City, Utah. Inc.: April 10, 1907. Capital: 2,000,000 shares; par value 50c; 1,177,180 shares issued. Property: Daisy Black group; 7 patented, 33 unpatented claims, Dome dist.; Howe. R. R. Arco, 42 miles. Development: Approximately 18,000 feet of underground workings, the principal of which is No. 4 tunnel, in which is an inclined shaft 550 ft. long with 4 intermediate levels. When this tunnel was completed to 2800 ft. in length, a raise was put through at its end and connection made with the old workings. Plant: MINE: Hoist and 2 compressors, one electrically driven, one oil-driven; complete mining equipment and camp. MILL: 75-ton concentrator, electrically driven. Ore: Silver-lead. Remarks: Report not filed for 1936.

NAME OF MINE MINING DIST. OWNER P. O. ADDRESS
Apex Gr. Lava Creek C. H. Beck Martin
Apex, Apex 3 Lava Creek Edward Dahle Martin
Badger, 1, 2, 3, 4 Hamilton William Duesner Howe
Badger Creek Hamilton Frank Peete Clyde
Betty Lou Lava Creek C. V. Genoway Boise
Big Butte Hamilton B. A. Smith Arco
Black Hawk Hamilton Chas. W. Johnson Howe
Bluebird et al. Hamilton Roy Hawley Howe
Bonanza Gr. Dome W. W. Brown Arco
Bozette Gr. Lava Creek J. W. Gamett Moore
Comstock Lava Creek Mrs. E. H. Brim Martin
Copper King Gr. Lava Creek B. A. Smith Arco
Copper Queen Lava Creek Mark Cherry Arco
Crafter View Gr. Lava Creek J. Y. Greene et al. Arco
Crown Point Lava Creek P. J. McQuaid Arco
Cut Wall Hamilton W. A. Beakley Blackfoot
Denver Gr. Lava Creek Leonard Dresser Emmett
Divide et al. Lava Creek Mary V. Stone Martin
Edmonville Hamilton Louis Edmon Howe
Ella Lava Creek B. F. Morrison Martin
Flora Hamilton G. W. Hooper et al. Howe
Foot Wall Lava Creek Ardel Gamett Moore
Garage Lava Creek C. J. Samuels Arco
Gold Belt Gr. Lava Creek J. M. Walker Blackfoot
Granite Mountain Lava Creek E. H. Hammond Arco
Gray Wolfe et al. Hamilton S. H. Abbott Howe
Great Western Lava Creek Daniel Romney Arco
Happy Hooligan Lava Creek Ardel Gamett Moore
Hidden Treasure Lava Creek Mattie D. Martin Martin
Homestake Lava Creek J. F. Huf Arco
Hub Gr. Lava Creek S. O. Nelson Boise
Humdinger Lava Creek Ole Anderson Martin
Iron Dyke et al. Lava Creek V. R. Markel Martin
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CAMAS COUNTY


History and Future

The mines of this county have a good production record and although not active at present, offer excellent opportunities for the future. The chief need is the intelligent application of modern geologic and metallurgical principles.

Review of Year's Operations

Activity in Camas County was confined mostly to assessment and development work. Prospecting and testing was carried on in the Skeleton, Big Smoky, Little Smoky and Willow Creek districts.

The Paradise Gold Dredging Company, Inc., dug a pit and put down 39 test holes on the Big and Little Smoky.

The Isabella Leasing and Development Company had a crew of three men developing the property.

The Little Smoky dredge operated with success during the year. Fifteen men are on the payroll. This boat is a Yuba dredge equipped with 58 buckets, each having a capacity of two and one-half cubic feet. This placer ground is 17 miles from Fairfield.

Glacier Gold Placer Mining Company had a crew of four men on repair and maintenance work in the Skeleton Creek district.

Consolidated Mines Syndicate performed annual labor and maintenance work with plans to reopen the property in the near future.

Five Points Mining and Milling Company, Inc., employ a crew of 10 men in their mine and mill. Concentrates are shipped to Utah smelters by truck.

J. A. Grosvenor, Box 86, Hill City, and associates opened up the old Bowerman group near Hill City. An incline shaft and other development work at the property disclosed showings that encourage further effort on the part of these men.

CARRIE LEONARD MINING CO.


CLIPPER GOLD MINING & MILLING CO.

CONSOLIDATED MINES SYNDICATE
(See Boise, Elmore and Idaho counties.)

FIVE POINTS MINING & MILLING COMPANY, INC.

GLACIER GOLD PLACER MINING CO.

GOLD BLOSSOM MINING & DEVELOPMENT CO., INC.

GOLD MOUNTAIN MINES CO.

HIDDEN TREASURE MINE & MILLING CO.

IDAHO PLACER MINES CO.

THE ISABELLA LEASING AND DEVELOPMENT CO.
MINING INDUSTRY OF IDAHO

A FOREST SERVICE HIGHWAY, LITTLE SMOKY MINING DISTRICT, CAMAS COUNTY

THE LITTLE SMOKY DREDGING COMPANY

THE PARADISE GOLD DREDGING COMPANY, INCORPORATED
LITTLE SMOKY DREDGING CO.'S DREDGE

RED HILL MINING & MILLING CO.

RICHARD ALLEN MINES CO.

SILVER STAR-QUEENS MINES, INC.

SMOKY MOUNTAIN GOLD MINES, INC.

TAFT MINE
<table>
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<th>NAME OF MINE</th>
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<td>Fourth of July</td>
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<td>209 So. 3rd St.,</td>
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<td>Hercules</td>
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<td>King of the West</td>
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<td>Square Deal</td>
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</table>

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Geology and ore deposits of the Seafoam, Alder Creek, Little Smoky and Willow Creek districts, Custer and Camas counties, by C. P. Ross: Idaho Bureau of Mines and Geology Pamphlet 33, 1930.*

CANYON COUNTY

The only known mineral resources of this county are gold in the Snake river sands, diatomaceous earth, and clays of excellent quality. A number of companies have been formed to drill for oil and gas, but to date no results have been obtained.

INTERMOUNTAIN COOPERATIVE GAS & OIL CO.

NEW ERA MINING & DEVELOPMENT CO.

PARMA DEVELOPMENT CO.

UNITED DEVELOPMENT CORPORATION

UNITEDUTILITIES CORPORATION

BIBLIOGRAPHY
See pages 102-103 for publisher’s address, meaning of reference marks, and abbreviations.

CARIBOU COUNTY


History and Future

The tremendous resources of this county have only been scratched. A large part of five billion tons of marble phosphate rock estimated to be in Idaho, lies in this county. The Anaconda Mining Co. at Conda has the only development making use of this deposit. They have a modern plant for the production of ground phosphate rock which is shipped to Anaconda, Mont., for treatment. This company has expended more than $6,000,000 in its mine, mill, railroad, power lines and town site.

The salt deposits and mineral springs are other potential resources that are not being utilized.

A number of structures favorable for the accumulation of petroleum are found in the eastern part of the county.

Review of Year's Operations

Activity on Caribou Mountain resulted in production of gold and stimulated prospecting in this area.

C. B. Wilson developed his holdings near Alexander to some extent during the year.

At Conda, the Anaconda Copper Mining Company, produced phosphate rock with a crew of 34 men. The concrete raise and stations were completed, repair work was accomplished on various levels, and supplementary hoisting and loading facilities were added during 1936. This mine and plant is one of the best equipped in the State of Idaho and maintained at a high degree of efficiency.

ANACONDA COPPER MINING CO.

Office: Anaconda, Mont. Officers: C. F. Kelley, Pres.; D. B. Hennessy, Pres.; D. B. Hennessy, Sec., both of 25 Broadway, New York City; E. M. Norris, Local Mgr., Conda, Idaho. Inc.: Filed in Idaho, April 10, 1916. Capital: 12,000,000 shares; par value $50; 8,919,086 shares issued. Property: 23 patented claims, 3403 acres, unorganized dist.; Conda. Development: 3 adits, 45 ft. above railroad track level, 9x9 ft. inside of timbers; No. 1, 6650 ft. long; No. 2, 2660 ft. long; No. 3, 5987 ft. long. Approximate total development 51,700 ft. The main operating tunnels are equipped with 25-lb. rail, 36-in. gauge track, two 20-ton storage battery locomotives capable of hauling a 100-ton net load at a speed of 4 to 7 miles per hour, 10-ton side dump ore cars, power loading machines operated by compressed air and No. 4 sirocco fan. Plant: MINE: 1000 cu. ft. compressor; drill sharpeners; machine, blacksmith and carpenter shops with latest type power-driven equipment; switch boards and motor generator charging set; laboratory; electric substation, sawmill and preservative plant for treating mine timbers, all housed in fireproof gunited and steel buildings; 100 h. p. electrically driven hoist. MILL: Crushing and drying plant. The mill feed and storage bins are connected with the main tunnels by large trestles. The storage bins, with a capacity of over 4000 tons, and houses over them are protected with several inches of gunite. The main storage bin is equipped with an Ottumwa boxcar loader and modern railroad scales. The rock drawn from the mill feed bin, which has a capacity of 450 tons, passes over shaking grizzlies, the oversize going to a 12-in. Traylor gyratory crusher, which reduces it to about 2½ in. The product from the crusher and the undersize is elevated and passed over a Mitchell vibrating screen. The rock passing through this screen goes to the dryer feed bin, and the oversize to 22x54-in. Anaconda rolls that reduce it to three-fourths of an inch. The product from the rolls is elevated and
again passes over the Mitchell vibrating screen. The crushed rock drawn from the dryer feed bins is conveyed into class A-12 Ruggles-Coles dryers by apron feeders. After leaving the dryer the rock goes over a shaking feeder to a chain bucket elevator. This elevator carries it to the top of the mill where it passes through a Vezin sampler, and it is then conveyed to the storage bins. The present capacity of the mill is 400 tons in 24 hours. This output can be increased to 1000 tons in the same time by adding another dryer. Railroad: 8-mile branch from Soda Springs to mine, with storage tracks that will accommodate 100 fifty-ton railroad cars, spurs to mill and coal bins, and Wyes at each end of the yards. The gradient of the storage tracks is such that the cars are operated by gravity to and from the storage bins. Town: The company has erected a model mine town consisting of modern homes, which are rented to employees at a nominal figure. Company offices, bunk and boarding houses, superintendent's home, recreation hall, and a number of small homes have been erected. A fully equipped store is maintained by the company, a postoffice has been established, and a modern schoolhouse erected, and a school maintained. A complete water system for the town and plant has been installed; the water is piped a distance of 2 miles to a 100,000-gallon storage tank from which it is distributed. Ore: Phosphate rock. Men Employed: Average 34. Remarks: 811 ft. of development. During the year concrete lined shaft completed with stations, and complementary hoisting and loading equipment.

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**CASSIA COUNTY**


BIG BERTHA MINING CO., INC.

GOOSE CREEK & DEVELOPING CO.
SILVER HILLS MINING CO.

Office: 1258 Crandall Ave., Salt Lake City, Utah. Officers: A. A. Firmage, Pres.-Mgr.; L. M. Francis, Sec., both of Salt Lake City, Utah. Inc.: March 31, 1920. Capital: 800,000 shares; par value 10c; Aug. 7, 1930, increased to 1,000,000; 600,000 shares issued. Property: Busy Bee and Joveon groups; 38 unpatented mining claims, Black Pine dist.; Black Pine. Development: 3 tunnels, 1 shaft; approximately 3400 ft. total development. Plant: Gas-driven compressor; complete mining equipment and camp. Ore: Lead-silver. Remarks: Preparations for considerable development work on main tunnel.

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Contact phenomena associated with the Cassia batholith, Idaho, by Alfred L. Anderson: Jour. of Geol., vol. XLII, No. 4, 1934.

CLARK COUNTY

County Seat: Dubois. Area: 1778 sq. miles. Population: 1122. Principal Industries: Farming and stock raising. Transportation: Idaho-Montana state highway and Pocatello-Butte branch of Union Pacific. Mineral Resources: Lead, silver, copper, zinc, coal and bentonite. Possibilities of oil and gas. The Birch Creek district in the northwest corner of the county, is an extension of the Nickolla district of Lemhi County. There were no activities reported from this district during 1934.

BIRCH CREEK MINING CO., LTD.

GOLD NUGGET MINES, INC.

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CLEARWATER COUNTY


History and Future
The Pierce City district was the scene of the first discovery of gold in Idaho in 1860. The placer diggings were rich and the overflow from the resulting stampede caused the settlement of the State. In common with all of the early gold mining districts, the more easily handled ore was mined and the district became dormant. The present search for gold has caused much new activity in the district.

Dense vegetation and heavy overburden has made prospecting extremely difficult and has prevented a thorough examination of the county in the past. This is one of the most favorable districts in the state for the prospector and small operator.

One of the finest lime deposits in the State is located just outside of Orofino on the railroad. This deposit has received some development and should be an important resource in the future.
Review of Year's Operations

Washington-Idaho Lime Products Company worked a crew of 30 men in the production of "Orofino Brand Cement." This plant has a capacity of 700 barrels daily. E. J. Simons, Spokane, Wash., is president.

Crystal Lime Company, Orofino, produced lime rock from an open quarry with a crew of eight men. W. F. Robertson, president, L. R. Loomis, secretary, both of Orofino.

J. R. Crawford did some surface work with an hydraulic giant at the Crawford Gold Strike. In removing the overburden and placer gravel some promising ledges were uncovered.

A stationary washing plant was built on the Crawford placers on Cow Creek by H. F. MacFarland, who formerly operated in the Boise Basin.

Seven miles down Orofino Creek from Pierce a 303 Lima shovel and dragline was installed by M. J. Bray, 627 So. Arthur St., Spokane, Wash. It is reported that 2,000,000 yards are available with a good content in gold. Seven men are employed.

Gold Dredging Incorporated operated their three and one-half cubic foot flume-type dredge on Rhodes Creek during the year with a crew of 15 men.

Other properties were worked under lease and bond, including Independence Placer Mining Company, Ltd., M. & I. Mining Company and Patterson Mines Incorporated.

Prospectors were active in this county and old timers state that millions of yards of placer gravel around Pierce City can be reworked that will average 25 cents. Judge E. B. Steele, Orofino, has control of these pooled holdings.

ALDER CREEK MINING CO.

AMERICAN PLACER MINING CO., LTD.

COBRA MINING & MILLING CO.

CRAWFORD GOLD STRIKE (not incorporated)

CRYSTAL LIME COMPANY

INDEPENDENCE PLACER MINING CO., LTD.
M. & I. MINING CO.

OXFORD COPPER MINING CO., LTD.

PATTERSON MINES INC.

SEWELL LIME CO.

WASHINGTON-IDAHO LIME PRODUCTS CO.

WESTERN METALS PRODUCTS CO.

NAME OF MINE MINING DIST. OWNER P. O. ADDRESS
Aurora et al. Pierce City Franz Magnus Orofino
Chloe Pierce City A. B. Rhude Pierce
Collins Pierce City J. E. Collins Pierce
Cow Creek Pierce City J. R. Crawford Oorfino
Deep Placer Moose Creek E. J. Hughes Pierce
Dream, The Pierce City Fred Forsman Pierce
Gold Dust Gr. Pierce City Chas. Rogers Pierce
Gold Island Pierce City Lewis Pratt Pierce
Granite et al. Ruby Creek P. A. Hughes Bovill
Jericho Burnt Creek F. A. Losekamp Elk River
K. H. C. et al. Ruby Creek K. Barkas Elk River
Little Joe Pierce City Joseph Frank Oorfino
Little Mascot Pierce City Earl McHenry Oorfino
Lone Pine et al. Pierce City J. R. Crawford Oorfino
Ozark Pierce City Chas. Meyer Greer
**CUSTER COUNTY**

**NAME OF MINE** | **MINING DIST.** | **OWNER** | **P. O. ADDRESS**
---|---|---|---
Oyama et al. | Pierce City | Agnes M. Kelly | Spokane
Rummel et al. | Pierce City | James Clark | Pierce
Russell Gr. | Pierce City | J. E. Rudsersdorf | Pierce
Silver Creek Pl. | Pierce City | Gus Anderson | Pierce
Snake Creek Pl. | Pierce City | G. V. Friedman | Pierce
Trapper et al. | Pierce City | R. E. Willoughby | Pierce
Venus Placer | Burnt Creek | John Pearson | Dent
Vida Pl. et al. | Pierce City | J. H. Wells et al. | Pierce
Wendell Placer | Burnt Creek | Walter Wendell | Dent
Wonder | Pierce City | P. H. Sayles | Lapwai
Yukon et al. | Burnt Creek | Peter Skjarve | Deary

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**CUSTER COUNTY**

**County Seat:** Challis. **Area:** 4921 sq. miles. **Population:** 3162. **Principal Industries:** Mining, stock raising, particularly sheep and agriculture. **Relief:** High and mountainous, few level spots except at head waters of Salmon River. The county contains the headwaters of the Salmon River, Big and Little Lost Rivers. **Transportation:** A system of well kept state and federal highways serve all of the valleys. The only railroad transportation is the Mackay branch of the Union Pacific which terminates at Mackay. **Mineral Resources:** Silver, copper, gold, zinc, antimony, molybdenum, tungsten, graphite, bentonite and garnet.

**History and Future**

This county was the scene of much early day activity in both precious and base metal mining. At one time there were several smelters running in the county and the production of high-grade silver-lead and silver-copper ores made the county one of the principal mining districts of the State.
Some of the most famous early day producers of the State were in this county and there is no doubt but that it will again attain its former prominence with increased prices for gold and silver, particularly when the price for lead and copper once again becomes normal.

Numerous old properties, with large production records and known ore reserves, await the operator with the courage to reopen them.

**Review of Year’s Operations**

Installation of the power plant at the Clayton Silver Mines, Inc., H. B. Kingsbury, Wallace, Idaho, president, has been completed. As soon as the pipe line is laid to convey water to the power plant the mill will be ready to roll. Cross cutting has been started to determine the width of the new ore body discovered north of the main Clayton workings. A highway is being constructed along the Salmon River which when finished will facilitate transportation, and the forest service is building a road from Clayton to the mine, a distance of one and one-half miles that will connect with the main highway. This operation is the largest in Custer County at present with a crew of 30 men employed. C. A. Fay of Clayton is in charge at the property.

The Red Bird Mine of the Ford Motor Company did maintenance and repair work only.

Leasers operated at the Ramshorn mine in the Bayhorse district and shipped some high-grade ore.

Some activity around Mackay was confined to leasing and annual labor.

The Kinnikinick Silver-Lead Mining Company has been formed to take over and develop seven claims, covering 140 acres on the west side of Kinnikinick Creek, near Clayton. The property adjoins the Clayton Silver Mine on the north. A tunnel is in 185 feet, and is expected to crosscut the ore zone of the Clayton silver vein. Ore is said to be seven per cent concentrating lead-silver ore. Stock is being sold as it is needed to finance development work. William H. Thompson is president of the company, and Calvin Wright is secretary-treasurer, both of Burley.

Leverett Davis, of Gibbonsville, is reported to have leased the property of the Greyhound Mining and Milling Company, Ltd., which comprises seven patented claims in the Seafoam district, near Stanley. The mine has been idle for about ten years. Peter J. Smith, Comtux Stage, Boise, is president of the company.

C. H. Lord and associates have started operation of their 3000-yard dredge in the Stanley Basin. Operations will be conducted on a 24-hour basis with a crew of nearly 30 men employed. Test holes are said to show values of 25 cents a yard. The ground is four miles long and ranges from one-fourth to one-half mile in width. The camp and equipment is built on tractors and wheels so that the entire outfit is portable. Diesel engines supply the power.

Yankee Fork district was the scene of much activity during the year. J. F. Barnhill had camps established on Yankee Fork working both placer and lode.

Walter C. Green had a crew of three men at the American Dollar Mining and Milling Company. The property consists of nine unpatented claims. The mill was rehabilitated with plans to add additional equipment soon. Approximately 700 ft. of old workings reopened. Property incorporated Dec. 15, 1936.

Wm. A. Dunn leased the McCombick Estate, at Custer, consisting of 15 patented claims taking in the Custer, Chas. Dickens, Lucky Boy and Continental properties. This was sub-leased to J. Arthur Thompson, Tacoma, Wash., who had six men employed under name of “Custer Test.” Otto D. Rohlf, engineer, was in charge of this work.

The McFayden property was rehabilitated by a man named Burnett, who worked a crew of 15 men. Milling was done at A. F. and E. E. Reamsnyder’s 60-ton custom concentrator.

Placer operations in the vicinity of Robinson bar operated with success. Baxter Lightfoot, Clayton, claims there are 1,250,000 yards of placer ground available on Jordan Creek that will average better than 25 cents a yard that could be worked by dragline.
AMERICAN DOLLAR MINING & INVESTMENT CO., LTD.

AMERICAN DOLLAR MINING & MILLING CO.

AZTEC MINING & MILLING CO.

CLAYTON SILVER MINES CO.

CRATER MINES, INC.
Office: Rigby. Officers: Harry S. Thayer, Pres.-Mgr., New York City; Geo. E. Hill, Sec., Rigby. Inc.: Aug. 30, 1927. Capital: 300 shares, no par value; increased Nov. 23, 1927, to 1,000,000 shares; par value $1; increased May 31, 1928, to 2,500,000 shares; par value $1; 983,000 shares issued. Property: Crater group; 39 unpatented claims at the head of Slate Creek, held under lease and option. Boulder dist.; Mackay. Development: Principally by 1 tunnel 700 ft. long, and an inclined shaft 150 ft. long. Plant: Small gas-driven compressor; complete mining equipment and camp. Ore: Lead-antimony-silver. Remarks: Report not filed for 1936.

EAST STAR MINING CO.

FORD MOTOR CO.
Office: Dearborn, Mich. Officers: Edsel B. Ford, Pres.; B. J. Craig, Sec., both of Dearborn, Mich. Inc.:Filed in Idaho, Jan. 6, 1925. Capital: 1,000,000 shares; par value $100. Property: Red Bird and Silver Rule groups; 30 patented claims, including 5 mill sites, Bay Horse dist.; Clayton; R. R. Mackay, 70 miles. Development: Principal development on Red Bird group consists of 4 tunnels; No. 1, 500 ft. long; No. 2, 1300 ft. long; No. 4, 510 ft. long; No. 9, 1680 ft. long, giving a total depth of 900 ft. on the vein; total development approximately 23,817 ft. Plant: Hand tramming and storage battery motor; shops and mining camp consisting of 11 buildings. Ore: Lead-silver. Men Employed: 1 watchman. Remarks: Maintenance and repair only.
GEM STATE MINING CO. (not incorporated)  

GREYHOUND MINING & MILLING CO., LTD.  

HERMIT MINES OF IDAHO, INC.  

IDAHO POWER & MINES CO.  

IVANHOE MINING CO. (see Blaine County)  

LOON CREEK HYDRAULIC PLACER MINING CO., LTD.  

MACKAY METALS  
Office: Mackay. Officers: A. J. Anderson, Pres., Vancouver, B. C.; F. A. Stacey, Sec.; J. Ray Weber, Mgr., both of Mackay. Inc.: June 4, 1928. Capital: 1,500,000 shares; par value $1; increased April 13, 1929, to 2,000,000 shares, par value $1; 1,200,000 shares issued. Property: Empire Copper group; 10 patented, 23 unpatented claims, Alder Creek dist.; Mackay. Development: More than 21 miles of underground workings, the principal entries being the Cossack and Alberta tunnels; the Cossack is 1000 ft. below the Alberta tunnel; the principal shaft, which is in the Alberta tunnel, extends 350 ft. vertically to the 1000 ft. level. Plant: MINE: Air-driven hoist; 1500 cu. ft. Laidlaw-Dunn-Gordon and 1200 cu. ft. Nordberg compressor, both steam-driven; and an aerial tramway 16,300 ft. long connecting mine with railroad. MILL: 250-ton concentrator, consisting of fine grinding and flotation. Ore: Copper-silver-gold. Remarks: Report not filed for 1936.

PHEMSPACE MINES CO.  
CUSTER COUNTY

RAMSHORN MINES CO.

ROUGH CREEK PLACER MINING CO.

SALMON RIVER MINING CO.

STANLEY-FIVE BARS MINING CO.

TWIN APEX MINES CO.

WASHINGTON BASIN MINING & MILLING CO.

WHITE KNOB MINING CO.

YANKEE FORK DREDGING SYNDICATE

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<td>Boulder</td>
<td>R. M. Black</td>
<td>Clayton</td>
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<td>Pandora et al.</td>
<td>Alder Creek</td>
<td>D. H. Horton</td>
<td>Mackay</td>
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### NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
--- | --- | --- | ---
Peerless | Alder Creek | J. E. Campbell | Mackay
Pinion Gr. | Sheep Mountain | J. A. May | Boise
Pilot House | Alder Creek | M. S. Vaught | Mackay
Port Arthur | Bay Horse | F. Giampedraglia | Clayton
River Queen | Bay Horse | Phillip Gossi | Clayton
Rob Roy | Bay Horse | Caesar Maraffio | Clayton
Rosemount | Stanley | Henry Lund | Stanley
Rough Creek | Yankee Fork | G. W. Friend | Clayton
Ruby Silver et al. | Bay Horse | Moses Le Fever | Clayton
Rusty Saw et al. | Stanley | P. H. Rasche | Stanley
Sheep Mountain | Seafoam | C. M. Rankin | Salt Lake City, U.
Silver | Yankee Fork | A. J. Franklin | Stanley
Silver Bell | Alder Creek | Johnson & Haney | Mackay
Silver Bell | Bay Horse | Jas. H. Marker | Challis
Singer Gr. | Sheep Mountain | W. H. Brose | Boise
Snowdrift | Yankee Fork | Frank Casto | Challis
Solon Jr. | Aito | Martin & Clark | Mackay
South Butte | Bay Horse | Jennie E. Horne | Boise
Speculator | Alder Creek | H. P. Hunter | Mackay
Square Deal | Bay Horse | M. E. Crawford | Clayton
Sun Rise | Alder Creek | F. A. Stacy | Mackay
Sunrise et al. | Loon Creek | J. T. Metcalf | Clayton
Syrup Can et al. | Alder Creek | S. W. Anderson | Mackay
Taylor Gr. | Alder Creek | Taylor & Munson | Mackay
Tip Top | Alder Creek | Gus Munson | Mackay
Tracy et al. | Seafoam | A. R. Smith | Challis
Turtle | Bay Horse | N. S. Churchill | Mackay
Uncle Ben et al. | East Fork | C. S. Ellis | Challis
Vulture et al. | East Fork | R. H. Van Meter | Challis
Wixahachia | Alder Creek | S. W. Anderson | Mackay
Wedge Fr. | Boulder | A. W. Walker | Mackay
White Elephant | Alder Creek | Daniel Clark | Mackay
Whynot | Yankee Fork | Amos Franklin | Clayton
Woodstock | Bay Horse | Geo. E. Keyser | Challis
Yellow Jacket | Stanley | Ed Martin | Stanley
Zodiac | Bay Horse | A. D. Sargent | Challis

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CUSTER COUNTY

The genesis of the Mackay copper deposits, by J. B. Umpleby: Econ. Geology, vol. 9, pp. 307-358, June, 1914.§
Geology and ore deposits of the Mackay region, Idaho, by J. B. Umpleby: U. S. Geol. Survey Prof. Paper 97, 1917.‡
Ground water in Pahsimeroi Valley, Idaho, by O. E. Meinzer: Idaho Bureau of Mines and Geology Pamphlet 9, 1924.**
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Geology and ore deposits of the Seafoam, Alder Creek, Little Smoky and Willow Creek districts, Custer and Camas counties, Idaho, by C. P. Ross: Idaho Bureau of Mines and Geology Pamphlet 33, 1930.*

ELMORE COUNTY


History and Future

The county was a noted early day producer of gold and silver, both placer and lode. In common with most of the gold producing districts, interest in
gold mining lagged with the extraction of the free gold and the district became dormant. The recent search for gold has given the mining districts new life and a profitable production.

Improved metallurgical methods and more efficient application of geology opens up an excellent future for this district. It is a favorable one for the prospector, operator and investor.

**Review of Year's Operations**

The new road up the middle fork of the Boise River to Atlanta is completed and no doubt will prove an asset to mining in this county.

The Boise-Rochester mine at Atlanta, until recently operated by the St. Joseph Lead Company, has been acquired by the Sawtooth Company, A. H. Burroughs, Jr., 715 Grove, Boise, president. The mine, a gold producer, was purchased by the St. Joseph company about 20 years ago, but was not equipped with the present 200-ton amalgamation-flotation mill until 1931. The deal included the mine, mill and hydroelectric plant. It is understood that the Sawtooth company will not operate the property on its own account, but that operations will be carried on by others. This mine led the State in gold production the past few years. Forty-eight hundred twenty-five feet of development work performed during 1936.

A 50-ton mill on the Monarch Mine near Atlanta, is nearing completion. The property is being operated by C. H. Phippen, Atlanta, and associates, organized as the Last Chance Mining Company. The Monarch property is owned by C. F. Phippen and was operated under lease by the St. Joseph Lead Company, during the time that company operated the Boise-Rochester Mine. Work was carried on through the Boise-Rochester workings and a considerable portion of St. Joseph production is stated to have come from the Monarch.

The Elk Creek Spanish Town Mines have been organized by C. L. Romig, Twin Falls, O. J. Johnson, also of Twin Falls, and Walter H. Busell of Buhl. Romig is president. The property is in the Rocky Bar district. It is planned to develop the property to a depth of 500 feet under the supervision of A. K. Lindsay before they attempt to build a mill.

Canada Gold Mines, Inc., J. L. Mercer, Route 2, Buhl, president, Earl W. Murphy, secretary, Boise, did maintenance work and added a new ore bin that will hold 80 more tons.

Five hundred feet of development work was done at the Cordova Mining Company in the Neal district, near Mayfield during the year. This property consists of six patented and seven unpatented claims known as the old Homestead and Hidden Treasure mines. Six men were employed.

Boise National Mining Company worked a crew of four men on placer property in the Black Warrior district. Present plans call for the installation of hydraulic equipment.

The Black Warrior district was discovered in 1903. It is a well mineralized area with known ledges over 100 feet wide. This district has been handicapped by lack of transportation facilities but since the Boise-Atlanta road has been completed easy access could be had by building a road up Black Warrior Creek about five miles. At present there are over 50 mining claims or groups of claims on which the assessment work has been done regardless of exemption laws. Supplies are taken in by means of pack animals and stone boats. This district is one of merit and entitled to a thorough investigation by scouts and engineers interested in gold-silver properties.

The Revenue group of the Consolidated Mines Syndicate, Frank E. Johannes, 623 First National Bank Bldg., Boise, president, was put in shape to drive 2000 feet of tunnel to cut ore zone. When this work is completed further equipment will be determined.

Test work was carried on by the Phelps Bros. Mining Company, a partnership located in the Rocky Bar district.

Gold King Mining Company at Pine was idle during the year.

At the Winner group, located in the Middle Boise district, Earl F. Money, Atlanta, owner, did some work on four unpatented claims.
Wide West Mining and Milling Corporation near Rocky Bar employed 22 men in opening up mine and building 50-ton amalgamation and flotation mill. Arthur H. Stevens was in charge of this work.

Yaqui Jack Mining Company, J. A. Grosvenor, president, Parma; David Isom, secretary, Caldwell, consists of two unpatented claims in the Elmore district near Hill City. Six hundred feet of development work was accomplished by a crew of eight men during the year.

Mountain Home was used by the Mountain City Copper Company of Nevada as a shipping point and supply base. One hundred ten miles of State road completed to property during the year.

APEX GOLD MINING CO.

ATLANTA GOLD MINE CORPORATION

BLACKSTONE MINING CO., LTD.
Officers: Jess Hawley, Vice-Pres.; Chas. W. Mack, Sec., both of Boise. Inc.: Dec. 26, 1899. Capital: 1,000,000 shares; par value 10c; shares issued unknown. Property: 5 patented claims, Blackstone dist.; Hill City. Remarks: Idle.

BLACK WARRIOR MINES, INC.

BOISE NATIONAL MINING COMPANY

CANADA GOLD MINES, INC.

CONSOLIDATED MINES SYNDICATE
Office: 623 First Nat. Bank Bldg., Boise. Officers: Frank E. Johnesse, Pres.-Mgr.; Paul L. Oakes, Sec., both of Boise. Inc.: May 6, 1924. Capital: 10,000 shares, no par value; Aug. 15, 1924, changed to 10,000,000 shares, $2.50 par value; May 2, 1925, decreased to 10,000,000 shares, par value $1; 3,358,757 shares issued. Property: Revenue group; 11 unpatented claims, Volcano dist.; Hill City. Development: By 1 tunnel 1453 ft. long. Plant: Gas-driven compressor; complete mining equipment and camp. Ore: Copper, gold and silver. Men Employed: 1 watchman. Remarks: Tunnel now underway to be driven 2000 ft. to cut ore zone and further equipment will then be determined.
CORDOVA MINING CO.

DALEY CONSOLIDATED MINES CO.

FIRST SECURITY MINING CO. (commonlaw trust)

FRANKLIN CONSOLIDATED GOLD MINES CO.

GOOD LUCK GROUP
Dollie M. Money, owner. Property: 3 unpatented claims; Middle Boise dist.; Atlanta. Development: Approximate total development, 200 ft. Remarks: 50 ft. of development during the year.

HYDRO MINING & EXPLORATION CORPORATION

IDAHO GOLD CHIEF MINING CO.

IDAHO MINES, INC.

IDAHO PACIFIC MINES, INC.
Office: Box 2058, Boise. Officers: Fred J. Babcock, Pres.; Earl W. Murphy, Sec., both of Boise. Inc.: May 9, 1931. Capital: 5,000,000 shares; par value 10c; all shares issued. Property: 2 unpatented placer claims, Bear Creek; Atlanta. Ore: Placer gold. Remarks: Maintenance only.

LAST CHANCE MINING CO.
MARSH CREEK MINING CO.
Officers: Roy Y. Bogard, Pres.-Mgr.; Curtis F. Pike, Sec., both of Boise. Inc.: July 9, 1921. Capital: 1,000,000 shares; par value $1; 39,625 shares issued. Property: 2 unpatented claims on Marsh Creek, Bear Creek dist.; Featherville. Remarks: Maintenance only.

PHELPS BROS. MINING CO.

MINERALS EXPLORATION COMPANY

NORTHWESTERN DEVELOPMENT CO.

GEORGE F. ROTH CO.

STANLEY-FIVE BARS MINING CO.

ATLANTA MILL, ST. JOSEPH LEAD CO.
ST. JOSEPH LEAD CO.
Office: 250 Park Ave., New York City. Officers: Clinton H. Crane, Pres.; H. B. McGown, Sec., both of New York City; Frank H. Skeels, Mgr., Atlanta. Inc.: Filed in Idaho, April 3, 1929. Capital: 2,000,000 shares, par value $10; June 8, 1931, increased to 2,500,000 shares; 1,955,713.85 shares issued. Property: Boise, Rochester and Atlanta groups; 10 patented, 19 unpatented claims, 3 of which are held partly under lease and option, Middle Boise dist.; Atlanta. Development: By 9 tunnels, the principal ones being No. 6 and No. 9; total development 27,350 ft. Plant: MINE: 987 cu. ft. electrically driven I-R compressor; 2 Mancha storage-battery locomotives; complete mining equipment. MILL: 200-ton amalgamation and flotation. POWER: 125 h. p. hydroelectric plant; 360 h. p. Diesel engine driving a 375 kva generator. Ore: Gold-silver. Men Employed: Average, 120. Remarks: 4825 ft. of development during the early part of 1936. June 20: The property closed down.

WIDE WEST MINING AND MILLING CORPORATION

WINNER GROUP
Earl F. Money, owner. Property: 4 unpatented claims; Middle Boise dist.; Atlanta. Development: Approximate total development, 615 ft. Remarks: Maintenance and annual labor only.

YAQUI JACK MINING COMPANY

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<tr>
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<th>MINING DIST.</th>
<th>OWNER</th>
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<td></td>
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</table>

**BIBLIOGRAPHY**

See pages 102-103 for publisher's address, meaning of reference marks, and abbreviations


Geology and water resources of the Snake River Plains of Idaho, by I. C.
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Mineralogy of some black sands from Idaho, with a description of the methods used for their study, by E. V. Shannon: U. S. Nat. Mus. Proc., vol. 60, art. 3, pp. 1-33, 1921.‡

FREMONT COUNTY

Coal, phosphate rock, oil shale and asbestos occur in different sections of this county. The occurrence of coal in commercial quantities in the northeastern corner of the county has been reported, but these deposits are too far removed from transportation to be available. The other deposits have never been sufficiently developed to prove their extent.

BIBLIOGRAPHY

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GEM COUNTY


The Pearl district was once a famous gold producer, this and a few outlying sections have seen considerable activity in the past. Much base ore
History and Future

Amenable to modern methods of concentration is reported in the old properties. This section should be given more attention by the present day operators.

Review of Year's Operations

Henry Reims discovered a six-foot vein of lignite coal near Montour. Alva Moreland and Kenneth Gaston, two experienced coal miners, were taken into partnership. The operation is being handled by dragline at present. While the coal is not as good in quality as the Wyoming or Utah variety, it burns to a white ash with little or no clinkers, and is guaranteed to be satisfactory for fuel.

Old Liberty Mining Company, Harry Sweet, Montour, president, extended tunnel 15 feet, added new equipment and started a raise from the main haulage tunnel. Considerable activity was noticed in the Pearl district. Some of the old producers were rehabilitated for future operations and small shipments were made during the year. Alexander Lode, Inc., reported 310 feet of development work with a crew of two men.


Crawford Ott of Twin Falls, did some work at the Lincoln property.

Merton Smith and son Willis rehabilitated a working tunnel at the Checkmate, located at Pearl.

It is reported the La Trinidad has been leased for further operation.

ALEXANDER LODE, INC.

FELIX MINING CO.

GOLD DIGGER GROUP

GRANITE STATE CONSOLIDATED MINES CO.

HECLA CHECKMATE MINING & MILLING CO., LTD.

THE INTERNATIONAL ENGINEERS & MFG., LTD.
THE INTERNATIONAL ORE MILLING & MINING CO.

LINCOLN MINE OPERATING CO.

NEW LIBERTY MINING CO.

OJUS MINING CO.
Office: Boise. Officers: William I. Phillips, Pres.; Elmer W. Fox, Sec., both of Boise. Inc.: June 14, 1932. Capital: 250 shares; par value $100; all shares issued. Property: Lincoln group; 5 patented claims, held under lease and option, West View dist.; Pearl. Development: By 2 vertical shafts, one of which is 540 feet deep; total development more than 8000 ft. Plant: MINE: 2 electrically driven hoists; complete mining equipment. MILL: 100-ton flotation concentrator. Ore: Gold-silver-lead. Remarks: Company in litigation and has been inactive since 1933. Property now in possession of the owners, Manufacturers Trust Co., 55 Broad St., New York City.

OLD LIBERTY MINING CO.

YELLOW GOLD PLACER CO.

<table>
<thead>
<tr>
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<th>MINING DIST.</th>
<th>OWNER</th>
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GOODING COUNTY

Placer gold, which is found in the gravel bars and sand along the Snake River, constitutes the only mineral resources of this county. These deposits are worked in a limited manner, and generally return the operator a fair profit on his labor.

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BIBLIOGRAPHY

See Snake River Gold under General Biography

IDAHO COUNTY

County Seat: Grangeville. Area: 8539 sq. miles. Population: 10,107. Principal Industries: Agriculture, stockraising and mining. Relief: With the exception of the high table land known as Camas Prairie, the county is of rugged mountains extending from the Snake River on the west to the Continental divide on the east. Rivers: South fork of the Clearwater, Salmon and Snake. Transportation: The western part of the county is served by a system of well maintained state and county roads. A highway up the south fork of the Clearwater River serves the Elk City district. That portion south of the Salmon River is served by the McCall-Edwardsburg forest highway. The balance of the county has very little transportation facilities but is being developed fast. The Stites and Grangeville branches owned jointly by the Northern Pacific and Union Pacific railroads are the only railroads. These serve the northern and Camas Prairie portion of the county. Mineral Resources: Gold, silver, copper, lead, zinc, antimony, tungsten, asbestos, talc, mica and molybdenum.

History and Future

During the early days of gold mining this county was one of the most productive in the State. Due to the inability of the early operators to handle...
base ore and the terrific handicap of lack of transportation facilities, mining became dormant throughout the county. Modern metallurgical process, new highways and truck transportation has given new life to these mining communities.

This county contains one of the largest and most favorable undeveloped mining districts in the United States.

One of the greatest opportunities presented today to the prospector, operator and investor is in the tremendous development which is due to take place in this region.

More than 1000 men were actively engaged in mining within the confines of Idaho County during the past year.

Review of Year's Operations

Ten Mile District

The Lone Pine, at Golden, owned and operated by F. O. Miller of Clarkston, Washington, was operated at the capacity of the 40-ton flotation mill until a shortage of water to the 250 h. p. hydroelectric plant slowed down operations. With a crew of 35 men an intelligent development and production program was carried out. Modern haulage equipment was installed last year.

The New York and the Buffalo Mining companies were active and enjoyed a fair margin of profit.

The Clearwater Mining Company installed a 20-ton mill, hydroelectric power plant, new administration building and general camp improvements while further development of the property for future production was carried on during the year.

The Idaho Corporation, near Golden, is opened up on several horizons. Frederick E. Snook, Golden, president and manager, plans to extend the lower tunnel a distance of 600 feet during the year 1937.

The Key, Tippie and Moose Creek placers were operated as long as the water lasted.

It is reported that Walter Hill of Grangeville has taken a lease and option on the old Montana Mine and preparing to develop property.

Annual labor was performed at the Gilt Edge Mines Corp.

At the Four Mile property a five-foot vein of milling ore was opened up and a 20-ton mill erected.

The Center Star was leased and bonded to Lewiston people who plan to install new mining and milling equipment.

The old Imogene property, owned and operated by a man named Griffiths, has been operated with fair profit the last few years and an extensive development program is under way.

The Morgan property, adjoining the Imogene, was developed to some extent.

The Black Bird mine was located, and is owned by V. P. Roe, Jess Reid and Jim Strickland. A vein of free milling ore three to five feet wide was opened up. The ore is transferred to a small two-stamp mill by tram for a distance of 1000 feet. The claim is 500 feet above the river near the Lone Pine power plant. It is reported that one ounce of gold is recovered from every ton milled.

Dixie District

The Dixie Comstock Gold Mining Company, W. H. Horobin, Seattle, Washington, president, completed a 50-ton mill, added new equipment and with a crew of 20 men carried on a development and production program until late in the fall of 1936.

Mammoth Mine Corporation was leased from R. S. Erb, president and R. G. Bailey, secretary, both of Lewiston, by the Bunker Hill and Sullivan Mining and Concentrating Company. An average of 16 men are employed under the supervision of Ed. Kavern. Camp buildings were erected and a considerable amount of development work accomplished during the year. Supplies have been freighted in to last until spring and work will be carried on during the winter months.
Loyalty Mines, Inc., employed five men at the property on development and installed Diesel engine, electrical equipment and cyanide plant.

The placer operation at Dixie, owned by Spokane interests enjoyed another very successful season. The plant consists of a power shovel and a washing plant that can be moved on skids.

The War Eagle operated throughout the season and shipments were made from their 25-ton mill.

The North Star carried on a program of development.

The Robinson Bros. erected a mill and operated a property known as the Dixie Dike at a fair margin of profit the last two years.

Stanley Litchfield worked a property with success on American River.

Elk River District

Elk City Gold Mines, Inc., established a camp and installed mining equipment at the Montgomery Mine and expect to operate all winter with a crew of 10 men. Supplies are in to last until the roads are open in June. Some high grade will be hauled over the snow to the highway a distance of six miles. Three hundred fifty-four feet of development work was completed during 1936.

Mt. Vernon Gold Mining Company operated a two-foot all-steel pontoon dredge on placer ground in Deadwood Gulch during the mining season. Dave E. Henderson, Mt. Vernon, Washington, is president and manager.


Sultan Gold Mining Company, H. C. Mowery, Wallace, president, is sinking on a two-foot vein, stated to bear high grade gold and silver values. The company recently installed a mill, which uses amalgamation and concentrating tables in its recovery plant, and is planning to install flotation cells. Jean M. Peters, Elk City, is consulting engineer and manager.

The Mary K. (Black Pine), Mother Lode, Gold Point and Mountain Boy were worked to some extent.

The Alamance was developed on the bottom level with a crew of 3 men. The property is located about five miles from Elk City, near the old Buster.

Orogrande District

If present work continues at the Gold Master Consolidated Mining Company, Inc., a 100-ton milling plant will be installed in the spring. About ten men have been employed for the past year at the property on development, camp construction, and installation of mining machinery. The pay streak was cut by the 800-foot lower tunnel 250 feet under the old shaft. Arthur A. Whaley, Peyton Building, Spokane is president and Bill Early, Orogrande, superintendent.

Una Mine Company installed a 65-horsepower marine boiler to be used to run a four drill compressor. The mine is being equipped for production. Edward Conley, Orogrande is manager.

C. Clinkenbeard, Spokane, Washington, manager and W. T. Clinkenbeard, Orogrande, superintendent, operated a placer known as the Lucky Five Mining Company. The RFC division of mining loans have considered this company for a loan of $20,000.

Orogrande-Frisco Gold Mines, Inc., J. R. Moore, president, 728 Sprague Ave., Spokane, Washington, developed the Regnier claims with 800 feet of tunnels and rehabilitated and improved the mill at a cost of over $300,000. This operation employs an average of 50 men. It is an open cut proposition in dike rock. The recovery is obtained by the cyanide process.

The Penman Corporation had a crew making general repairs, and blocking out ore. Surface buildings and flotation unit in the mill were added as well.

Gnome Gold Mining Co. worked their property with a fair margin of profit and added materially to the production figures for gold in the State during the year. A crew average of 25 men is maintained.
Some sampling and testing was carried on at the property known as The Commodore, on Crooked River. This company owns a number of claims on a mineralized dike the same as the Empire Metals Company, who hold 113 claims where the same program was in effect.

Salmon River District

Activity was noticed in the vicinity of Pollock and Lucile, where the B. R. & R. Co., and the McKinley Gold Mining Company are located. A bridge across the Salmon River at Lucile would no doubt be an asset to opening up a potential mining district as well as a large farming and stock raising section.

From Riggins to White Bird men were working along the river with outfits that ranged from crude skim-digging contrivances to hydraulic and power shovel methods.

Butcher Bar was taken over by Lewiston interests who plan to work this property in a big way and handle considerable yardage by a caving system. The gravel will be crushed to uniform size and trammed to the washing plant. L. H. House, 811 Prospect Ave., Lewiston, is president.

The Automotive Placer Company plan to install a power shovel and mobile washing plant that is mounted on wheels. This outfit is hooked together in tandem. It is planned to operate along the meander line below Slate Creek. Everett Sloane is manager and superintendent in charge of operations with headquarters at Slate Creek.

A power shovel and stationary washing plant was operated at Horseshoe Bend throughout the year with a fair margin of profit. At times gravel was encountered that averaged seventy cents a yard. Fuel costs and truck charges for hauling gravel to washing plant, and repairs to steam shovel cut down what might have been a very successful operation.

L. L. Long with a crew of four men had a good year in Box Canyon above Black Hawk Bar.

Florence District

With the completion of new roads, better transportation facilities may be had into this district. Scouts and engineers visited this section for examinations which resulted in the moving in of machinery for operation during the coming year. Roads to Florence connect up with the main highway at Slate Creek and Grangeville. Nineteen thirty-seven presents a very optimistic outlook for increased activity in mining around Florence.

Burgdorf-Marshall Lake District

Some development work and repair was accomplished at the War Eagle Gold Mining & Milling Company.

Idaho Klondike Mining Co., Mark Evans, Bergdorf, president improved the camp, constructed a road, lowered the main tunnel four feet and made an advance of 60 feet. This property is an underground placer, tapping the gravel in an old river channel.

A new road was built to the Golden Anchor, Sherman Howe and Kentuck properties with CCC labor.

Golden Anchor, operated by United Verde, an Arizona corporation, worked a crew of 30 men and ranks near the top with the other principal gold producers in the State. An airport was built for winter transportation and considerable development work completed. The mill finished in 1935, is a 50-ton steam driven Lane Chilean mill and cyanide plant.

Some activity with prospecting and development work was accomplished at several properties near the Golden Anchor and on California Creek including the Sherman-Howe, Old Kentuck, Little Johnnie, Cuban and others located on Fall and French creeks.

Warren District

The Idaho Gold Dredging Company enjoyed a very successful year in the production of gold with dredges. The steam dredge was changed to an electric.

Fisher & Baumhoff moved their “Mickey Mouse” that was operating in the town of Warren to Granite Creek in the Boise Basin where it is now operating.
Plans to move the Anderson Dredge to ground on American River may be carried out in the near future.

The Unity Gold Production Company, located at Warren, completed a development program and worked a crew of 30 men on production and repairs during the year. This company furnishes electric power to dredges in this district.

Several small operations were working at lode and placer holdings in this district, and the total production figures for the year 1936 amount to quite a snug sum.

**Edwardsburg District**

Edwardsburg is located 76 miles from Cascade and is the distributing center for the Forestry department and this mining district. Supplies are trucked in from Cascade, a distance of 76 miles. A landing field is located at Big Creek Headquarters near Edwardsburg that facilitates quicker service for emergency calls and winter transportation.

Authorities claim this section has possibilities of becoming a potential and permanent gold producing area as soon as the development stage is passed.

A road down Big Creek in place of a pack trail would open up a very promising mining section.

Some activity was noticed on Profile Gap between Yellow Pine and Edwardsburg on coming into this district and also on Elk Summit when enroute to Warren.

Pierce Metals development Company, operating the Snowshoe property, on Crooked Creek, expects to be in full production soon, treating 50 tons of ore daily. During the year the mine was developed on the 500-foot level and put in shape for production. Ore bins and a 25-ton amalgamation and flotation concentrator, connected by a tram trestle 478 feet long were constructed. The camp is well equipped with buildings and a saw mill that can turn out 3000 feet of lumber daily. It is planned to build a dam to store several acre-feet of water for power to generate 65 horsepower. The water will be transferred 3300 feet through a pipe 20 inches down to 2 3/4 inches in diameter and needle which will propel a Pelton wheel. H. J. Maib, Grandview, Washington, president, Thomas W. Nevitt, Clarkston, Washington, secretary. L. A. Smith, also of Clarkston is superintendent.

The Werdenhoff on the North Fork of Smith Creek was changed to The Idaho Mine. J. W. Routson did assessment work on the claims. A 5-stamp amalgamation and concentration mill is on the property.

Golden Hand, Inc., C. W. Mason, Warren, president and Harry M. Smith, Tacoma, Washington, secretary, employed an average of seven men. Five hundred feet of development work was completed during the year. The company expects to increase capacity of mill to 50 tons.

Smith Creek Placers with a crew of 15 men made a six months run near the mouth of Smith Creek. Two hydraulic giants were operating under the direction of the late L. W. Kiene of Seattle, Washington.

Jimmie Hand developed three claims on Sheep Eater Mountain, known as the Grey Horse, Brown Horse and Blue Horse. This property consists of three parallel veins running east and west. The center one with a gold content flanked on each side by silver veins with good showings.

**ALTA-IDAHO GOLD & COPPER MINING CO.**


**BEST CHANCE GOLD MINES CORPORATION**

B. R. & R. CO., INC.

BLACK DIAMOND

CAL-IDAHO MINING CO.
Office: 403 Seventh St., Huntington Beach, Calif. Officers: Edward H. Cookingham, Pres., Lindsay, Calif.; M. G. Jones, Sec., Huntington Beach, Calif.; Thomas Berry, Mgr., Elk City. Inc.: Not filed in Idaho. Capital: 250,000 shares; par value $1; all shares issued. Property: Gold Hill placer; 7 patented claims, 9 unpatented claims, held under lease and option, Elk City dist.; Elk City. Plant: 8-mile ditch; complete hydraulic equipment and mine camp. Ore: Placer gold. Men Employed: Average, 6.

CENTRAL IDAHO MINING & MILLING CO.

CHANNEL GOLD CORPORATION

CLEARWATER MINING CO.

COMMODORE GOLD MINING CO.

CONSOLIDATED MINES SYNDICATE
(See Boise, Camas and Elmore counties) Property: Blue Jacket group; 7 patented claims, Crooks Corral dist.; Lucile. Development: By 3 tunnels, the principal one being 868 ft. long; approximate total development, 3254 ft. Remarks: Idle.

COPPER QUEEN MINING CO., INC.
CORNER STONE MINING & MILLING CO.

CROOKS CORRAL MINES, LTD.

DAVIS MINING CO.

DIATOM PRODUCTS CO.

DIXIE COMSTOCK GOLD MINING CO.

EMPIRE METALS CO.

ESPERANZA GOLD DIKES MINING CORPORATION

GIANT LEASING CO.

GNOME GOLD MINING CO.
GOLD BUG MINING CO.  

GOLD MASTER CONSOLIDATED MINING CO., INC.  

GOLD POINT MINES, INC.  

GOLD RUN MINING COMPANY  

GOLDEN ANCHOR MINING CO.  

GOLDEN HAND, INC.  

THE GOLDEN HAND EXTENSION MINING CO.  

GOODENOUGH UNITED MINING & MILLING CO., LTD.  
HOPE GROUP

THE IDAHO CORPORATION

IDAHO EAGLE MINES, INC.

IDAHO GOLD DREDGING CO.

IDAHO GOLDFIELDS, INC.
IDAHO KLONDIKE MINING CO.

IDAHO NEWSOME MINING & MILLING CO., INC.

JUMBO MINING & MILLING CO., LTD.

KEY PLACERS CORPORATION

LINNTON MINING CO.

LONE PINE GROUP

LONG TOM MINING CO.
LOYALTY MINES, INC.

LUCKY DAY & BEMIS LOOKOUT GROUPS

LUCKY FIVE MINING CO.

MAMMOTH MINE CORPORATION

MAMMOTH MINING & DEVELOPMENT CO.

THE MARY K. MINES, INC
McKINLEY GOLD MINING CO.


MONTE CRISTO MINING CO.


NORTH HILL MINING CO.


OROGRANDE-FRISCO GOLD MINES, INC.


OROGRANDE GOLD MINING CO.


PACIFIC CONSOLIDATED MINES, INC.


PENMAN MINES CORPORATION


PIERCE METALS DEVELOPMENT CO.

IDAHO COUNTY

PILOT KNOB GOLD CORPORATION

RED FIR MINING CORPORATION

REEDS CREEK GOLD MINES CO.

ROBINSON MINING & MILLING COMPANY

SALMON RIVER EXPLORATION CO.

SALMON RIVER MINERS, INC.

SALMON RIVER MINING & MILLING CO.
Officers: John Wm. Errington, Pres.; R. A. Daniels, Sec., both of Spokane, Wash. Inc.: June 8, 1931. Capital: 500,000 shares; par value 10c; increased Jan. 3, 1932, to 1,500,000 shares; 655,404 shares issued. Property: 12 unpatented claims, unorganized dist.; Riggins. Ore: Gold. Remarks: Laboratory testing only.

SALMON RIVER PLACER COMPANY

SECEESH DREDGING MINING & MILLING CO.
SENTINEL MINES CORPORATION

SHERMAN HOWE MINING CO.

SLATE CREEK GOLD MINING CO.

SPRING BARR PLACER CO.

SULTAN GOLD MINING CO., INC.

SUMMIT FLAT MINING CO.

SYLVANITE GOLD-COPPER CO.

TIAWAKA MINES, INC.

UNA MINE CO.
UNITY GOLD PRODUCTION CO.

WARREN CREEK DREDGING CO.

WAR EAGLE GOLD MINING & MILLING CO.
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IDAHO COUNTY
## NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
--- | --- | --- | ---
Red Horse Pl. | Elk City | Schuyler Simmons | Elk City
Red Warrior | Orogrande | Frank Peck | Orogrande
Reservation | Cottonwood | J. L. Eckert Est. | Cottonwood
Ridley Gr. Pl. | Unknown | Nettie Deasy | Spokane, Wash.
Riverview Gr. | Camp Howard | E. O. Kirkham | Trindt, Mont.
Sacramento | Ten Mile | M. H. Williams | Grangeville
St. Louis | Robbins | Mrs. Carrie M. Stone | 75 Federal St., Boston, Mass.
Salmon Point Bar Pl. | Rapid River | M. O. Cox | Riggins
San Francisco | Robbins | Felix A. Raney | Modesto, Cal.
Shamrock et al. | Warren | H. Cook | Warren
Shorty’s Bar Pl. | Camp Howard | Hans L. Hagen | Grangeville
Silver King Gr. | Warren | Sigo Myers | Savannah, Ga.
South Fork Gr. | Elk City | Wm. Badger | c/o W. D. Scott, Spokane, Wash.
Stanton Eddy & Sherwin Pl. | Unknown | P. E. Sherwin Est. | Grangeville
Subway Gr. | Orogrande | H. W. Harris | Elk City
Surprise Gr. | Dixie | J. R. Painter | Dixie
Tahoma Pl. | Camp Howard | Chas. Lyons | Whitebird
Tennessee | Robbins | Tryphena Taylor | Lewiston
Thomas Malone Pl. Unorganized | Marshall Lake | Frank G. Hatke | Kuterville
Tivola | Elk City | George Braig | Elk City
Trout Gr. | Elk City | Geo. Trout | Elk City
Two B Bar Pl. | Camp Howard | C. C. Byers | Lewiston
Twin Butte et al. | Orogrande | Frank M. Peck | Orogrande
Uncle Sam | Elk City | J. E. Brown | Elk City
Union Gr. | Orogrande | Robert Pulz Est. | Orogrande
Venture Gr. | Robbins | James M. Martin | Orogrande
Winslow | Robbins | Mr. Ed Hightsman | Ontario, Ore.
Wise Boy | Robbins | E. N. Oliver Est. | Grangeville
Wonder Gr. | Ten Mile | Dr. W. D. Cowan | Grangeville
Yale | Robbins | J. M. Shissler | Grangeville
Yankee Boy | Robbins | D. A. Sasenbery | Grangeville
Yankee Girl | Robbins | P. Klinkhammer | Orogrande

## BIBLIOGRAPHY
See pages 102-103 for publisher's address, meaning of reference marks, and abbreviations.


Geology and water resources of Nez Perce County, Idaho, by I. C. Russell: U. S. Geol. Survey Water-Supply Papers 53 and 54, 1901.†


Mineralogy of some black sands from Idaho, with a description of the methods used for their study, by E. V. Shannon: U. S. Nat. Mus. Proc., vol. 60, art. 3, pp. 1-33, 1921.‡


KOOTENAI COUNTY


History and Future

Very little development work has been done on these mineral resources but some very encouraging results have been obtained. They are worthy of further attention.

BEAUTY BAY MINING CO.


BLUE BIRD MINING CO.


CARIBOU MINING CO., LTD.


COEUR D'ALENE-SPOKANE MINING CO.

Office: Helena, Mont. Officers: C. A. SpaULDING, Pres.; Bessie B. Bryte, Sec., both of Helena, Mont. Inc.: Sept. 6, 1918. Capital: 1,000,000 shares; par value $1; 500,000 shares issued. Property: 3 patented claims, Medimont dist.; Lane. Development: By 1 tunnel 200 ft. long and a 100-ft. vertical shaft. Remarks: Idle.

COMMONWEALTH METALS CO.


CONNIE MINING & MILLING CO.

CRYSTAL SPRING MINING CO.

GRAY WOLF MINING CO.

GREAT WESTERN COPPER CO., INC.

HAMBURG AMERICAN COPPER MINING & MILLING CO.

HAYDEN LAKE MINING & MILLING CO.

HIGH CROPPING SILVER-LEAD MINING CO.

IDAHO DIAMOND SULPHIDE MINING COMPANY, INC.

KING SOLOMON MINING & MILLING COMPANY

LITTLE NORTH FORK COPPER MINING & MILLING CO., LTD.
PALISADE MINING & MILLING CO.

RADIO MINING CO.

RAINBOW MINING & MILLING CO., LTD. (See Shoshone & Benewah Counties)
(See Benewah County for capital structure.)

RAINBOW NO. 2

RAINBOW NO. 4

RIVERSIDE COPPER MINING CO., LTD.

THE ROYAL BASIN MINING CO.
Office: Coeur d'Alene. Officers: A. H. Moe, Pres.-Mgr.; Vina Moe, Sec., both of Coeur d'Alene. Inc.: Dec. 24, 1910, as Royal Mining Company; name changed June 8, 1934. Capital: 1,500,000 shares; par value $1; June 8, 1934, capital reduced to $150,000, divided into 1,500,000 non-assessable shares; par value 10c; 520,000 shares issued. Property: 9 unpatented claims, Wolf Lodge dist.; Coeur d'Alene. Development: By 3 tunnels, the principal one being 500 ft. long. Ore: Gold-silver. Remarks: Idle.

SHAMROCK SILVER MINING COMPANY, INCORPORATED

NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
---|---|---|---
Adams | Hayden Lake | Burnt Cabin Mng. Co. | Coeur d'Alene
Big Vein Gr. | Hayden Lake | C. Wm. Gralapp et al. | Medicine Lake
Blue Bell | Unorganized | C. W. Williams et al. | Coeur d'Alene
Bonnie | Hayden Lake | Burnt Cabin Mng. Co. | Coeur d'Alene
Chilco Group | Unorganized | C. Wm. Gralapp et al. | Medicine Lake
Commander et al. | Medimont | Albert T. Allen | Medimont
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**BIBLIOGRAPHY**

See pages 102-103 for publisher's address, meaning of reference marks and abbreviations.


Composition and origin of certain commercial clays of northern Idaho, by Edward L. Tullis and F. B. Laney, vol. 28, No. 5, Econ. Geol., 1933.

LATAH COUNTY


History and Future

Very little has been done to develop the metallic resources of the county, however, the non-metallic resources, particularly the fire clay deposits near Troy have been actively exploited.

Many opportunities for profitable development are available in this district. Near Elk City is a district of merit that should receive more attention in future.

ACE MINING CO.


CASSIDY GOLD MINING & MILLING CO., LTD.


COLUMBIA MINES CORPORATION


MIZPAH GROUP


RIVERSIDE GROUP

ENGINEERS GOLD MINING COMPANY

GOLD HILL MINING & MILLING CO.

IDAHO CERAMIC MATERIALS CO.

IDAHO FIRE BRICK & CLAY CO.

MOSCOW QUEEN MINING CO.

SPOKANE-IDAHO COPPER CO.

TROY GOLD & COPPER MINING CO., LTD.

NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
---|---|---|---
Anny Gr. | Hoodoo | P. Doffner | Harvard
Avon | Hoodoo | J. H. Nesbit | Deary
Bonanza Gold Pl. | Gold Creek | Wm. J. Schmidt | Potlatch
NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
---|---|---|---
Clara Lester Gr. | Gold Creek | James C. Throop | Palouse
Eureka Gr. | Gold Creek | Edwin N. Carrico | Potlatch
Excelsior | Gold Creek | Arthur P. Gilliam | Potlatch
Gold Bug | Gold Creek | Arthur P. Gilliam | Potlatch
Idaho | Hoodoo | G. E. Arrasmith | Harvard
Knapp Bros. | Hoodoo | Harry Knapp | Potlatch
Midas | Hoodoo | H. N. Gray | Potlatch
Monday | Hoodoo | V. P. Wiesenthal | Palouse, Wash.

**BIBLIOGRAPHY**
See pages 102-103 for publisher’s address, meaning of reference marks, and abbreviations.

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Ground water for municipal supply at Potlatch, Idaho, by V. R. D. Kirkham: Idaho Bureau of Mines and Geology Pamphlet 23, 1927.**


Composition and origin of certain commercial clays of northern Idaho, by Edward L. Tullis and F. B. Laney, vol. 28, No. 5, Econ. Geol., 1933.

**LEMHI COUNTY**

County Seat: Salmon City. Area: 4597 sq. miles. Population: 4643. Principal Industries: Agriculture, stock raising and mining. Relief: This county contains the broad valleys of the Salmon, Lemhi and Pahsimeroi rivers but otherwise is high and mountainous. Transportation: The main valleys are served by a well maintained system of state highways and the back country can be reached over a system of Forest Service roads. The only railroad into the county is the Pittsburgh and Gilmore from Armstead, Montana, into the Lemhi Valley. Mineral Resources: Lead, copper, silver, gold, zinc, tungsten, manganese, molybdenum, nickel, cobalt, gypsum, tin and lignite.

History and Future

This county has had a very productive and profitable mining career in the past, both of base and precious metals. In common with most gold producing districts, with diversified resources, the trend was toward base metal until the present activity in gold mining.

During the last few years, a tremendous activity in the gold fields has taken place and the district is rapidly assuming importance in this respect. The people are alive to their opportunities and have formed the “Lemhi County Mining Ass'n” for the express purpose of presenting these opportunities to investors and operators.

This district has a prosperous future in prospect and is an ideal territory for the prospector, operator and investor.
Review of Year’s Operations

While there were no large operations in Lemhi County during 1936, approximately 500 men were employed or actively engaged in mining, and conditions seem to warrant an optimistic opinion for the future prosperity of mining ventures in this county. It is estimated the total production for the past year will reach a value of something over $300,000.

Installation of a flotation plant is practically completed at the Steen Mine, adjoining the Yellow Jacket property of the Buckhorn Gold Corporation. This property, also known as the Continental group, is leased and will be put into active production by spring. Wallace V. Peck is at Forney with the leasing company.

Regular shipments are going forward from the Buckhorn Gold Corporation, operating the Yellow Jacket Mine, 13 miles from Forney, under the management of Royal Grain. F. W. Stevenson is superintendent. New equipment was added to the mill, including a ball mill which will bring the capacity up to 125 tons daily. Plans call for enlarging the plant to handle 300 tons.

At the Columbia group, the mine and mill were rehabilitated and expect to be on a production basis in the near future.

Ima Mines Corporation, near Patterson, operated throughout the year with a crew of 16 men. The ore contains hubernite, wolframite, some scheelite, molybdenite, and rhodochrosite. Eight hundred feet of development work was completed and additional equipment installed, which included a 42-inch Pelton wheel, six slime tables and 12-inch, 4-pole Rounds-Weatherel High Intensity Magnetic Separator for tungsten cleanup.

A bunkhouse was constructed at the Gold Stone Mine, on Pratt Creek. Two hydroelectric plants are being installed and the mill was remodeled to house a new flotation mill. The mine is near the Continental Divide at an altitude of 8000 feet. The company expects to work a crew of men all winter.

The Lang Mine was leased to West States Mines, Inc., who are promoting and developing property at present. Two hundred forty-four feet of work finished during year.

John McGovern, Boise, purchased the interests of his two partners and operated a hydraulic placer near Gibbonsville. At present the crew is employed near the mouth of the North Fork of the Salmon River, washing gravel in an old river channel.

The Gibbonsville Mining and Exploration Company was recently organized to operate claims in the Gibbonsville district.

Holly Bros. made a couple of shipments reported to contain high silver values from Grizzly Hill.

The Aurora, on Toe Jam Creek, was developed by a group of Idaho Falls men. A crew of 8 men is employed.

The 50-ton flotation mill, built by Leverett Davis, Seattle, operated on custom ore from the surrounding districts. About four different properties produced some ore around Gibbonsville and the town is regaining the mining atmosphere of other days.

The Golden Lode Mining Co., Inc., completed 650 feet of development work during the year with four men.

Gold Hill Mines, Inc., employed a crew of 30 men for the first six months of the year. Several new buildings were finished, 100-ton mill put in operation and 440 feet of development work was accomplished.

The Indian Creek Leasing Company operated the Ulysses and Kitty Burton mines, under lease and option. About 30 men were employed in production. R. M. Taylor is in charge of operations.

The Double Eagle Gold Mining Company, L. B. Wakefield, president, was recently formed and incorporated in Idaho to operate some placer ground, about 48 miles from Salmon City. Equipment has been installed and an intensive testing and development program carried on.

A crew of 20 men will be employed throughout the winter at the Ranger property of the Equities, Inc., with Edward F. Fitzhugh, Jr., Box 246, Salmon, in charge. A road to the mine is completed and camp construction and mill enlargements are underway. Production is expected in the immediate future.
Owl Mining Co., Inc., did maintenance and repair work during the year. Eighty-five feet of development work was performed at the Tri-State Gold Mining Company's holdings.

Milo Zook had a good year at the Latest Out Mine of Gilmore. Regular shipments were made to the smelter from this property.

The Monolith Mine above Shoup was developed to some extent during the year.

The U. P., Burlington and Blackburn claims were examined and tested. The old Virginia Mining Company property on Sandy Creek, formerly known as the McKillop group, acquired by T. D. Picard, Vancouver, B. C., did considerable development work and shipped concentrates from the property.

Ned Smith and Geo. Gahan worked a property on Musgrove Creek.

In the Leesburg Basin several properties were active during 1936. Butschke Bros. made nice recovery from high placer ground on Jureaneau Creek.

A small dragline was operated on Moose Creek and John Mullen used a caterpillar with a "tumble-bug" scraper, with fair results.

Goff Bros. had another very successful season at their property on Arnett Creek.

The Shoo Fly, in the Eureka district, owned by James G. Sims of Salmon, although handicapped by lack of better transportation, operated with a crew of nine men.

Plans are now under consideration for the erection of a mill by the Gibbonsville Mining and Exploration Company. Testing has been completed and steam shovels may be used for mining.

California Bar Syndicate under the direction of Mr. Geary, mining engineer, put down 72 test holes. Bedrock was encountered from 24 to 41 feet. To verify the values found, it is planned to sink about 15 encased shafts. Material for this work is on the ground.

Fred Brough produced ore from the Clara Morris at Gibbonsville which was custom milled.

AMERICAN CONSOLIDATED MINING & MILLING CO.


BUCKHORN GOLD CORPORATION


CONTINENTAL GROUP


DELAWARE—IDAHO GOLD MINING CO.

DOUBLE EAGLE GOLD MINING CO., INC.

ELDORADO GOLD MINING CO.

GIBBONSVILLE PREMIER GOLD MINE, LTD., INC.

GILMORE MERCANTILE COMPANY

GOLD FLATION DEVELOPMENT CO.

GOLD HILL MINES, INC.

GOLD PRODUCERS, INC.

GOLDEN LODE MINING CO., INC.

IDAHO FALLS GOLD MINING COMPANY
IDAHO LEMHI PLACERS, INC.

IMA MINES CORPORATION

LANG MINES, INC.

LANG GOLD CO.

LATEST OUT MINING & SMELTING CO.

LEAD MOUNTAIN MINING CO.

LEESBURG BONANZA PLACER CO.

LEESBURG LODE & PLACER MINING CO.
LEMHI UNION COMPANY


MEADOW MINES, INC.


NAPIAS PLACERS, INC.


NORTHWESTERN DEVELOPMENT CO., LTD.


OWL MINING CO., INC.

POCATELLO-LEMHI MINING & EXPLORATION CO.

RESCUE GOLD MINES CO.

SOUTH GILMORE MINING CO.
Office: Idaho Falls. Officers: Richard Martin, Pres.; Albert Martin, Sec., both of Idaho Falls. Inc.: Nov. 12, 1929. Capital: 300,000 shares; par value 1c; Apr. 1, 1931, increased to 1,000,000 shares, par value $1; 51,305 shares issued. Property: 9 unpatented claims, held under lease and option, Spring Mountain dist.; Gilmore. Development: By 4 tunnels; No. 1, 600 ft. long; No. 2, 1000 ft. long; No. 3, 1600 ft. long; No. 4, 1300 ft. long, in which is an inclined shaft 1200 ft. long, which gives a vertical depth of 988 ft. on the vein. Ore: Lead-silver. Remarks: Idle.

TRI-STATE GOLD MINING COMPANY

UNITED IDAHO MINING CO.
Office: No. 1, State St., c/o U. S. Smelting, Refining & Mining Co., Boston, Mass. Officers: C. A. Hight, Pres.; F. W. Batchelder, Sec., D. D. Muir, Jr., Mgr., all of Boston. Inc.: Oct. 18, 1924. Capital: 10,000 shares common, no par value; 10,000 shares preferred, par value $10; June 20, 1930, preferred shares decreased to 7504; 7053 shares common, 7267 shares preferred issued. Property: Pittsburgh-Idaho group; 5 patented claims, Texas dist.; Gilmore. Development: By 4 tunnels; No. 1, 600 ft. long; No. 2, 1000 ft. long; No. 3, 1600 ft. long; No. 4, 1300 ft. long, in which is an inclined shaft 1200 ft. long, which gives a vertical depth of 988 ft. on the vein. Ore: Lead-silver. Remarks: Idle.

UTANA MINING CORPORATION

VIRGINIA GOLD MINING & MILLING COMPANY
Officers: Orville M. Norton, Pres.; Chas. E. Norton, Sec., both of Salt Lake City, Utah. Inc.: Aug. 21, 1925. Capital: 2,500,000 shares; par value 1c; 1,700,000 shares issued. Property: 13 patented and 9 unpatented claims, Pratt dist.; Baker. Development: By 7 tunnels, the principal one being 400 ft. Remarks: Report not filed for 1936.
WINDER-STILLMAN CON.
Office: Salmon. Officers: R. H. Winder, Pres., Salt Lake City; J. W. Jones, Sec.-Mgr., Salmon. Inc.: Form of organization unknown. Capital: 1,000,000 shares; par value 1c; 446,118 shares issued. Property: Pope-Shenon group; 12 patented claims, Eureka dist.; Salmon. Development: 6 tunnels: No. 1, 70 ft. long; No. 2, 80 ft. long; No. 3, 400 ft. long; No. 4, 450 ft. long; No. 5, 800 ft. long; No. 6, 1000 ft long. Total development approximately 3000 ft. of underground workings. Plant: MINE: 2 12x10 I-R electrically driven compressors; Sullivan steel sharpener; complete mining equipment and camp. MILL: 60-ton electrically driven concentrator, including fine grinding and flotation. Ore: Copper. Remarks: Report not filed for 1936.

NAME OF MINE  MINING DIST.  OWNER  P. O. ADDRESS
Alex Stevens  Texas  Wm. H. Howard  Gilmore
Anaconda Gr.  Eldorado  J. H. Adams Est.  Salmon
Anaconda et al.  Blackbird  A. C. Ludwig  Salmon
Andy Lee  Gravel Range  F. M. Pollard  Los Angeles, Calif.
Arnett Cr. Pl.  Mackinaw  Christ StucKey  Leesburg
Baby Joe Gr.  Junction  W. F. Stone  Leadore
Belcher  Gibbonsville  Chas. Goff  North Fork
Big 8-Mile  Junction  J. D. Pritchett  Leesburg
Big Juneau  Leesburg  F. A. Butschke  Leesburg
Big Windy  Spring Mountain  Joe Jugovich  Gilmore
Blue Bird  McDevitt  E. G. Lynch  Digby, N. S.
Boulder Gulch  Mineral Hill  John Brittain  Salmon
Brown Bull  Texas  E. C. Ross  Salmon
Bryn Mawr et al.  Indian Creek  Davis Davies  Salmon
Buck-a-roo  Silvertown  W. J. Shoup  North Fork
Buckhorn  Junction  Sellers Bros.  Salmon
Burlington  Eureka  Paul Rossier  Salmon
Cabin  Unorganized  Frank G. Worthing  Salmon
California Pl.  Mackinaw  A. C. Ludwig  Reno, Idaho
Carrie Cady  Texas  H. S. Knight  222 Kearns Bldg.,
Clara Morris Gr.  Blue Wing  C. B. Graves  Salt Lake City, U.
Castle Rock  Gibbonsville  Largey Est.  Patterson
Clipper Bullion  Mineral Hill  Mrs. Ethel Suydam  46 E. Broadway,
Columbia  Yellow Jacket  A. C. Ludwig  Butte, Mont.
Copper Glance  Yellow Jacket  Chas. Anderson  Shoup
Copper King  Mackinaw  Earl R. Galbraith  Salmon
Daly Creek  Mackinaw  John M. Smith  Salmon
Democrat  Indian Creek  W. W. Smith  Ulysses
Diamond Gulch  Texas  Geo. Matics  Gilmore
Dig More No. 1  Junction  Thos. Grooms  Leadore
Dunton Placer  Gibbonsville  Geo. Matics  Leadore
Eagle Mine  Gibbonsville  Fred Chase  Leadore
Elmira  Junction  Alfred Anderson  Gibbonsville
Enterprise  Nicholia  Jas. Corcoran  Gibbonsville
Florence  Eight Mile  Milo W. Zook  Salmon
Forney Gr.  Eureka  Fred Dunton  Gilmore
Golden Rule  Eureka  R. E. Lee Ramey  Leesburg
Goldfield Gr.  Gibbonsville  W. B. Horn  Salmon
Gold Star  Mackinaw  A. W. Beason  Salmon
Goldstone  Mackinaw  J. A. Fry  Leesburg
Governor  Pratt Creek  Mrs. Isadore Gies  Great Falls, Mont.
Grace  Gibbonsville  F. C. Noble  Gibbonsville
Greenhorn Mines  Mackinaw  Thos. Pope  Salmon
Grizzly Hill  Mackinaw  F. S. Wright  Leadore
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**NAME OF MINE** | **MINING DIST.** | **OWNER** | **P. O. ADDRESS**
--- | --- | --- | ---
Silver Glance | Spring Mountain | Chas. J. Elg | Idaho Falls
Silver Moon | Texas | J. H. Lanyon | Gilmore
Sky Scraper | Junction | P. C. Sellers | Leadore
Smuggler et al. | Texas | Mac Carson | Gilmore
Speculation | Mineral Hill | Dave Sandilands | Salmon
Standard Placer | Eureka | Harry Kelly | Salmon
Sunbeam | Blackbird | Chas. Schultz | Salmon
Sunnyside | Texas | Jas. Sims | Salmon
Sunset | Mackinaw | Christ Stuckey | Leesburg
Tempest Gr. | Spring Mountain | Joseph G. Sims | Salmon
Tormey Gr. | Unorganized | Dr. F. S. Wright | Salmon
Tendoy | Unorganized | S. A. Matthews | Salmon
Uncle Sam | Spring Mountain | J. A. Nash | Gilmore
Union | Spring Mountain | James Sims | Salmon
Vaughn Placer | Mackinaw | T. Hungate | Leesburg
Verdun | Unorganized | Dr. F. S. Wright | Salmon
Vimedii | Carmen Creek | Burt W. Simer | Salmon
Viola | Nicholia | A. F. Shear | Reno
Walkover Placer | Hughes Creek | O. P. Kimmell | Salmon
War Eagle | Pratt Creek | Jack Turnblade | Baker
White Horse | Spring Mountain | O. M. Perkins | Gilmore
Yellow Jacket Pl. | Yellow Jacket | J. M. Burkhart, Jr. | Salmon

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The copper deposits near Salmon, Idaho, by C. P. Ross: U. S. Geol. Survey Bull. 774, 1925.§


Geology and ore deposits of the Birch Creek district, Idaho, by P. J. Shenon: Idaho Bureau of Mines and Geology Pamphlet 27, 1928,**


**LEWIS COUNTY**

**County Seat:** Nez Perce. **Area:** 470 sq. miles. **Population:** 5217. **Principal Industries:** Agriculture and lumbering. **Transportation:** The county is served by numerous highways and three railroads. **Relief:** Except a small area occupied by the Craig Mountains, the county lies on the Camas Prairie. **Mineral Resources:** Copper, gold, silver, marble and limestone.

**WINCHESTER COPPER MINING & SMELTING CO.**

**Office:** Winchester. **Officers:** T. A. Holmes, Pres., Peck; Alex Kasberg, Acting Sec., Lewiston. **Inc.:** Aug. 7, 1926. **Capital:** 1,500,000 shares; par value 10c; 928,237 shares issued. **Property:** Forest group; 10 unpatented claims, Deer Creek dist.; Winchester. **Development:** By 2 tunnels: No. 1, 520 ft. long; No. 2, 125 ft. long. **Plant:** Steam-driven Sullivan compressor; complete mining equipment and camp. **Ore:** Copper-silver. **Remarks:** Report not filed for 1936.

**BIBLIOGRAPHY**

See pages 102-103 for publisher’s address, meaning of reference marks and abbreviations.


ONEIDA COUNTY


NEZ PERCE COUNTY

County Seat: Lewiston. Area: 851 sq. miles. Population: 17,591. Principal Industries: The county is primarily an agricultural community and Lewiston is the commercial and civic center for this section of the state. Transportation: Lewiston is at the junction of the Clearwater and Snake rivers and will eventually be an important shipping point by water to the Pacific Coast. Good highways and two railroads serve the county. Mineral Resources: Copper, silver, gold, marble and limestone. Very little attention has been given these resources. The marble and limestone deposits particularly should be developed.

INDEPENDENT MARBLE & LIME CO.

BIBLIOGRAPHY
See pages 102-103 for publisher's address, meaning of reference marks and abbreviations.

ONEIDA COUNTY

The only known mineral resources of this county are: Bentonite; various clays of excellent quality; and the reported occurrence of copper-lead ores carrying gold and silver.

BLUE JAY MINING CO.
OWYHEE COUNTY

County Seat: Silver City. Area: 7596 sq. miles. Population: 4103. Principal Industries: Agriculture, stock raising and mining. Transportation: The roads of Owyhee County are very poorly maintained on account of its vast area and small taxation. One railroad, the Murphy branch of the O. S. L., serves the county. Mineral Resources: Silver, gold, copper, lead, zinc, antimony, diatomaceous earth, opals, manganese and nitrates.

History and Future

After the discovery of the rich silver veins of the Silver City district in 1863, the county was the chief producer in the state. The ores were some of the richest ever discovered and made the operators fabulous profits. The tremendous cost of the early day operations and poor milling methods caused a decline in the operations until the district became almost deserted. Greater geological knowledge, more efficient transportation and modern metallurgical methods will once again give this district the prominence it once had. It is extremely favorable as a field for operators and investors.

Review of Year's Operations

The Poorman Mines Corporation, reopening the Poorman property at Silver City, is planning the installation of a 50-ton gravity concentration and flotation mill. The company has just been organized and is making preparations for rehabilitation and development work at the property, which consists of seven patented claims. One shaft is to be reopened and the sinking of a new one 1000 feet to the west is proposed. Values are in gold and silver. Main office of the company is in Boise. Earl A. Pack of Caldwell is president, Guy R. Martin, secretary, and Elisha Lewis of Silver City is consulting engineer.

Idaho Exploration, Inc., has a lease on the Ida Bell Mine on Reynolds Creek. A mill was constructed at the property and considerable tonnage of concentrates was shipped to various smelters during the year. Plan to add new unit to the mill in the near future and open mine at a lower horizon. 170 ft. of development work was completed. W. H. Simons, 916 Hays Street, former State Mine Inspector, is president of the company. Office, 210 Noble Bldg., Boise, R. L. Overcash is secretary.

Goldsil Mines, Inc., are continuing the rehabilitation of properties located on Florida Mountain. S. P. Chaney is president, Glendale, California.

The Golden Reward Mining & Milling Co., with five unpatented claims in the Steele district near Oreana, employed three men making preparations to start development work. Values are in gold and silver. Joe Prilucik is president, Buhl.

Ten feet of development work was done on seven unpatented claims, Carson district, Silver City, by the Interstate Gold Mining Co. Harry S. Fry is president and Samuel A. Swayne secretary, both of Nampa.

Mother Lode Gold Mining & Milling Co. employed four men completing 200 feet of development work during the year. Intend to build a small mill. The property is the Wannensten Group, Carson district, Silver City. Held under lease and option. B. A. Smith is president and E. R. Clark, secretary and manager, both of Nampa.

Orogrande Gold, Inc., employed three men. Built a bunk house during the year and plan to erect a mill in the near future. C. R. Hansen is president, Boise.

Owyhee Exploration Co. employed a crew of three men. Rebuilt mill and retimbered 140 feet of tunnel. Property, four patented and eight unpatented claims, Flint district, Silver City. C. M. Haynes is president, Caldwell, Chris Irgens, secretary, Nampa.

Shipment of diatomaceous earth and bentonite were mined to some extent in this county during 1936. Considerable activity was noticed along the Snake River by placer operations in the recovery of flour gold.

The Texas-Owyhee Mining & Development Co. operated on Castle Creek with a crew of ten men. Their holdings were opened up and further devel-
oped to facilitate production. This company is also operating the Mayflower Mine in the Boise Basin near Quartzburg.

Development was in progress at De Lamar and at properties on War Eagle and South Mountain.

The Yuba Dredge of the Jordan Creek Placer Co. operated about five miles down Jordan Creek from De Lamar, and enjoyed a very successful season. The company has a complete camp for year-round habitation. Power is brought in from the Silver City sub-station, a distance of 15 miles. Frank B. Thornburg, Boise, is manager.

Some activity was reported at the Mountain Chief and at the Potosi mines at Silver City. It is expected that these properties will soon join the ranks of producers and add materially to the production figures of this county.

**AFTERTHOUGHT MINES CORPORATION**


**BANNER MINING & MILLING CO.**


**COSMOPOLITAN MINING CO., LTD.**


**EMPIRE MINES CO.**


**GOLCONDA GROUP MINING CO.**


**GOLDEN CHARIOT-WAR EAGLE MINES CO.**


**GOLDSIL MINES, INC.**

THE GOLDEN REWARD MINING & MILLING COMPANY

IDA BELL GOLD MINES, INC.

IDAHO EXPLORATION INCORPORATED

INTERSTATE GOLD MINING COMPANY

IDAHO GOLD & PLATINUM MERGER MINES CO.

WALTER J. LONG PLACERS INC.

MOTHER LODE GOLD MINING & MILLING CO.

OROGRANDE GOLD, INCORPORATED
OWYHEE DEVELOPMENT CO., INC.

OWYHEE EXPLORATION COMPANY

OWYHEE GOLD BUG MINES, INC.

OWYHEE GOLD MINING CO.

OWYHEE SILVER MINES CO.
POORMAN MINES CORPORATION  

SILVER CITY GOLD MINES, INC.  

VILLAGE BLACKSMITH, INC.  

WAR EAGLE CONSOLIDATED MINING CO.  

WAR EAGLE MINING & MILLING CO.  

<table>
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<th>NAME OF MINE</th>
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<td>F. Robinson</td>
<td>Nampa</td>
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</table>
### Owyhee County

**Nellie Ann No. 1**  
Carson  
Owner: W. W. Jones, M. D.  
P.O. Address: Jordan Valley, Ore.

**Ontario**  
Carson  
Owner: Mrs. J. Mattenson  
P.O. Address: Boise

**Owyhee et al.**  
Carson  
Owner: Emma Brumbaugh  
P.O. Address: Silver City

**Pauper**  
Carson  
Owner: R. H. Leonard  
P.O. Address: Silver City

**Poorman**  
French  
Owner: Fred Grete  
P.O. Address: Silver City

**Potosi**  
Carson  
Owner: Jack Stoddard  
P.O. Address: Silver City

**Rich Gulch**  
Carson  
Owner: Sam Williams  
P.O. Address: Tulsa, Okla.

**Roosevelt et al.**  
Carson  
Owner: R. Noble Est.  
P.O. Address: Boise

**Rose et al.**  
Carson  
Owner: James McNally  
P.O. Address: De Lamar

**Ruth**  
French  
Owner: Geo. Westlake  
P.O. Address: Hailey

**San Juan et al.**  
French  
Owner: Mary Grete Est.  
P.O. Address: Silver City

**Silver Leaf et al.**  
French  
Owner: N. C. Chapman  
P.O. Address: Boise

**Snow Storm et al.**  
French  
Owner: Lafe Boone  
P.O. Address: Boise

**Star Gr.**  
Carson  
Owner: Lewis Bros.  
P.O. Address: Silver City

**Sugar Loaf**  
French  
Owner: A. P. Nugent  
P.O. Address: Silver City

**Sunyside**  
Carson  
Owner: I. E. Barber, Trus.  
P.O. Address: Boise

**Tango et al.**  
Carson  
Owner: A. J. Swan  
P.O. Address: Nyssa, Ore.

**Tennessee et al.**  
Carson  
Owner: John Nemanic  
P.O. Address: Silver City

**Village Blacksmith**  
Carson  
Owner: Duncan & Lackey  
P.O. Address: Silver City

**Wannensten Gr.**  
Carson  
Owner: Andrew Wannensten  
P.O. Address: Nampa

**War Eagle Gr.**  
French  
Owner: Wm. Healy  
P.O. Address: Boise

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Geology and water resources of the Bruneau River basin, Owyhee County, Idaho, by A. M. Piper: Idaho Bureau of Mines and Geology Pamphlet 11, 1924.*


Geology and metalliferous resources of the region about Silver City, Idaho, by A. M. Piper and F. B. Laney: Idaho Bureau of Mines and Geology Bull. 11, 1926.*


PAYETTE COUNTY

The only known mineral resources of this county are diatomaceous earth, various clays of excellent quality, and natural gas, which has been developed at Payette.

BLUE MOUNTAIN MINING & DEVELOPMENT CO.

BOISE PETROLEUM CORPORATION

NORTHWEST DRILLING CO.

PAYETTE EXPLORATION COMPANY

BIBLIOGRAPHY
See pages 102-103 for publisher's address, meaning of reference marks and abbreviations.


POWER COUNTY

BANNOCK APEX MINES, INC.

IDAHO RESEARCH AND DEVELOPMENT CO.

BIBLIOGRAPHY
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Geography, geology and mineral resources of the Fort Hall Indian Reservation, Idaho, by G. R. Mansfield: U. S. Geol. Survey Bull. 713, 1920.†
Possibilities of petroleum in Power and Oneida counties, Idaho, by A. M. Piper: Idaho Bureau of Mines and Geology Pamphlet 12, 1924.**

SHOSHONE COUNTY

County Seat: Wallace. Area: 2597 sq. miles. Population: 19,060. Principal Industries: Mining and lumbering. Transportation: Oregon-Washington Railroad & Navigation Co., Northern Pacific Railway, and the Chicago, Milwaukee, St. Paul & Pacific Railroad serve the county. Yellowstone Trail, a paved highway, and a well maintained system of county roads reach into all mining districts. Rivers: St. Joe River, North and South Fork of the Coeur d'Alene River are the principal streams. Relief: The county lies on the west side of the Continental Divide and is mountainous with deep valleys and few level spots. Mineral Resources: The famous Coeur d'Alene Mining District is in the central part of the county. This district is a famous producer of lead-silver-zinc and copper. Other ores found are gold, antimony and tungsten.

History and Future
Mining in Shoshone County started with the discovery of gold on Prichard Creek in 1879. Although the chief excitement at this time centered in the gold placers near Murray, which proved very profitable, the major activity was transferred to the lead-silver mines on the South Fork after their discovery in 1885.

The gold district has continued to produce in a small way even to this day, but has been far overshadowed by the base metal mines which have developed until they produce approximately one-fourth of the lead and one-eighth of the silver of the United States.

The district contains the first, third and fifth largest lead producing mines in the United States, viz: The Bunker Hill & Sullivan, Morning and Hecla mines respectively. The largest silver producer in the United States is the Sunshine Mine, also located in this district.

The introduction of flotation, making possible the separation of the complex lead-zinc ores, opened up a vast new field of operations and today the district ranks as one of the important zinc producers of the country.
The continued development of new properties and the large ore reserves of some of the present operations assure a future comparable only to the past fifty years of large scale production, which in the five years prior to the depression averaged approximately 30 million dollars annually.

Review of Year's Operations

Records of the more notable events of 1936 in chronological order pertaining to the mining industry in the Coeur d'Alene district.

JANUARY

The year 1936 found its largest expansion in this district in the continued development of the properties in the “dry ore” silver belt, extending from Wallace westward to Big Creek. The Sunshine Mine maintained its position as the greatest silver producer of the nation. A wide program of expansion marked this great enterprise which now has reached a position whereby a million ounces of silver can be produced each month for the year.

The electrolytic zinc plant owned and operated by the Sullivan Mining Company at Kellogg reached its capacity production of approximately 70 tons of cathode zinc every 24 hours, which was maintained throughout the year.

Sunshine Extension Mining Company filed suit against the Coeur d'Alene Big Creek Mining Company seeking to quiet title to four lode mining claims in the Big Creek district.

Office headquarters of the Sunshine Mining Company were transferred from Yakima to the mine on Big Creek. The corporation was reported to have 2200 stockholders.

Dean A. W. Fahrenwald, of the School of Mines, University of Idaho, was elected chairman of Columbia section, American Institute of Mining Engineers.

Silver Dollar Mining Company driving long crosscut to intersect veins in the Purim group.

Merger Mines exposes ore showing by diamond drilling operations and starts crosscut to reach the vein.

The Shoshone County Flood Control camp, to house 100 workmen started a short distance east of the Evolution bridge.

The St. Elmo Mining Company installs power plant at its property in the silver belt.

Operations temporarily halted at the Jack White property in the Murray district on account of the danger existing from snowslides.

Manager Howard Stapleton announces plans for the active development of the Pontiac property in the Murray district.

Liberal King Mine on Pine Creek completes 3000-foot crosscut tunnel and exposed a body of lead-silver ore at a depth of 1200 feet.

The Silver Crescent Mine located in the Moon Creek district opens ore shoot showing values in silver, lead, and scheelite. Plans for deeper operations announced.

Sunshine reports production of 5,878,135 ounces of silver, 120 ounces of gold, 46,000 pounds of lead, 1,346,000 pounds of copper from which net smelter receipts were approximately $4,305,000 for the year 1935.

Coeur d'Alene Mines Corporation driving raise 600 feet to connect No. 5 tunnel with the 3 1/2 level.

Clayton Silver Mines Company reports shipment of a car of crude ore averaging 85.57 ounces silver and 61.55 per cent lead, having gross valuation after deduction of $94.62 per ton.

Metropolitan Mines on Big Creek installs new electrically operated hoist and prepares for deeper operations.

FEBRUARY

Bunker Hill & Sullivan directors declare regular dividend of 50 cents and special payment of 25 cents per share, totaling $245,250.

A six-drill compressor and other equipment installed at the Idaho Mother Lode Mine in the Murray district.

Two shifts employed in driving crosscut tunnel at Mineral Mountain property in the silver belt.
Mine rescue and first aid classes are being conducted in the district by James Wilson, in charge of the United States mine rescue car.

Stockholders of the Coeur d'Alene Mines Corporation hear report on property at informal meeting held in Kellogg.

Report values in gold, lead and silver disclosed in operations at the King Solomon Mine in the Fourth of July Canyon district.

Sunshine Mining Company officials announce plans under way for doubling capacity of the milling plant, which would give a capacity of more than 1000 tons daily.

Supreme court rules labor lien claimants have priority over attaching creditors in Constitution Mine case.

**MARCH**

Sunshine Company declares 50 cents per share dividend, totaling $744,411.

The two-mile tunnel driven through the Silver Summit and Chester grounds to provide an outlet for the Polaris ore nearing its objective.

Metropolitan lets contract to sink two-compartment shaft from the 200 to the 400-foot level.

Jack Waite Mine resumes operations following shutdown on account of the danger of snowslides.

Stockholders of the Syndicate Mining and Exploration Company ratify sale of holdings to the Silverton Mining Company.

Trapper Creek Silver Mining Company starts deep crosscut tunnel on its property in the Trapper Creek district.

President Brownell of the Federal Mining and Smelting Company reports net income for 1935 of $417,578.94 before depletion and depreciation.

Idaho Mother Lode remodeling milling plant to treat gold ore.

State Mine Inspector Arthur Campbell reports approximately 6000 miners employed in Idaho, a majority of whom are in the Coeur d'Alene district.

Assessment exemption bill introduced by Senator Borah granting moratorium on annual assessment labor on mining claims passed by the senate.

Federal Mining and Smelting Company officials report more than six years' ore supply available at its Morning Mine at Mullan.

The four-compartment shaft at the Sunshine Mine reaches the 800-foot station.

Manager Theodore Schmidt reports plans ready to resume development operations at the Palisade Mine as soon as snow conditions permit travel.

President James F. McCarthy of the Hecla Mining Company reports increased activities at the mine during past year with a profit of $907,228.75, from all sources.

**APRIL**

Three-compartment shaft at the Crescent Mine on Big Creek, owned by the Bunker Hill and Sullivan, passed the 200-foot level, below the mill adit tunnel. Deep operations are planned.

President Stanly A. Easton of the Bunker Hill and Sullivan reports ore reserves undercut and exposed totaling 2,588,321 tons on January 1.

Deep development operations planned for the Sunshine Consolidated by use of the Sunshine Mining Company shaft, work to be carried on from the 1700 level of the shaft.

The Phil Lynch group of claims in the Pine Creek district taken over by the Pine Creek Queen, Inc.

Silver Summit Mining Company to increase capital stock from 1,500,000 shares to 2,500,000 shares.

Byron Wilson, well known mining engineer, appointed superintendent of the Polaris Company.

Hecla Mining Company declares dividend of $150,000.

Liberal King Mine on Pine Creek opens promising ore shoot in east drift. Congress passes bill to exempt annual assessment work for year ending July 1, 1936.

Mines of the Coeur d'Alene district in 1935 made a net profit of $5,048,121.51 according to sworn statement based on record at the office of the county assessor.
Annual meeting of the Idaho Mining Association held at Lewiston.
The Rose Mining and Milling Company has been incorporated to develop the Giant Ledge property in the Murray district.

**MAY**

Sidney Mining Company officials report best showing in history of mine. Production is at the rate of 90 tons per day.
Stockholders of the Coeur d’Alene Mines Corporation elect new board of directors following battle for control by two factions.
Lucky Boy Mines Corporation reports disclosure of vein in wide shear zone.
Silver Bar Company officials report strike of grey copper and galena in drift on vein. Property in the Beaver Creek district.
Silver Summit Mining Company increases capitalization from 1,500,000 to 2,500,000 shares.
Diamond drills prospect vein at Liberal King Mine on Pine Creek.
Smelters reported seeking more lead and offering favorable contracts.

**JUNE**

Sunshine Company orders payment of 50 cents per share dividend totaling $750,000.
Plans for the development of the Blue Eagle property on Pine Creek announced by Manager Ed McCarty.
An important ore disclosure reported at the Chester property when the crosscut northward from the Silver Summit-Polaris tunnel reached the Chester vein.
Nancy Lee Mines, Inc., driving deep crosscut tunnel in the Keystone district.
Crosscut at Mineral Mountain property discloses large body of siderite and quartz carrying values in silver.
Officials of the Nine Mile Mining Company report plans under way for active development program.
Frank Eichelberger, manager at the Sunshine property for two years, resigned and was succeeded by R. B. Leisk, former vice president and manager of the United Verde Extension Company in Arizona. Mr. Eichelberger will remain in the district where he has extensive interests.
Diamond drill operations started at the King Solomon group in the Fourth of July Canyon district.
Contracts let for 60 feet of tunnel work at the property of the Aurora Mining Company on Deer Creek, to Sam Linn.
The Four Square Gold Syndicate announces outright purchase of all individual interest in the property entailing a payment of $40,000 in cash.

**JULY**

Sunshine Mining Company reports shipment of approximately 640,000 ounces of silver during month of June.
Contracts let to sink Polaris shaft additional 500 feet.
State Mine Inspector Arthur Campbell pays district an official visit.
Frank Eichelberger and associates secure control of the Callahan Zinc-Lead Company and plan extensive development program.
Lead quoted at $4.60 per hundred and zinc at $4.75.
Mine payrolls in the district show 400 men employed with payroll of approximately $600,000 monthly.
Sunshine’s four-compartment shaft passes 1200-foot station.
Hecla Mining Company ordered payment of $150,000 dividend.
A gold nugget weighing out $540 found in shallow diggings in Prichard Creek near Murray by Jim Clark.
Silver Crescent Mining Company takes lease and bond on adjoining property held by the Dickens Mining Company.
Rival factions in the Coeur d’Alene Mines Corporation appeal to court to settle dispute.
William J. Stratton announces plans to reopen famous old Minnie Moore property in the Hailey district.
Michael Melly, 86, one of the last of the early gold rush survivors, passed away on July 20. He had spent 50 years in the Murray district.

Construction of a 750-ton capacity mill to treat the ore from the Star Mine announced by President James F. McCarthy. Mill will be built at Burke.

Metropolitan shaft reaches the 400 level, from where crosscut will be extended to open two veins.

Sheriff sells property of the Constitution Mining Company on foreclosure of lien to satisfy judgment totaling $30,786.59 in favor of miners employed at property.

AUGUST

Boom is predicted in low grade mines of the northwest as consumption increases for lead and zinc.

Excavation work started for new Star mill at Burke.

Joshua Green, Seattle, elected director of the Sunshine Mining Company taking place made vacant by resignation of Frank Eichelberger.

Moon Creek area scene of much activity in several properties.

Silver Crescent will develop its properties through the 600-foot shaft of the Dickens Mining Company.

Zinc smelter at Kellogg is operating at full capacity.

Idaho Supreme Court declares Mrs. Katherine Mason of Kellogg owner of Sunshine mining stock worth approximately a quarter of a million dollars, following extensive court action against John Pelkes, Wardner pioneer.

Steady development operations reported at the Lucky Boy property on Big creek.

The 32nd annual Miners' and Smeltermen's picnic held at Kellogg.

The annual meeting of the Shoshone County Pioneers' Association held at Kellogg in connection with the annual miners' picnic.

St. Elmo officials report disclosure of ore in raise carrying high silver values.

SEPTEMBER

Sunshine Mining Company produces 850,000 ounces of silver during August.

Group of young mining engineers organized the "Geological Society of the Coeur d'Alenes" and plan extensive mineral exhibit at the Y. M. C. A. in Kellogg.

John M. Lovejoy of New York, president of the Institute of Mining and Metallurgical Engineers, guest of local mining men on his western trip.

Shaft at the Four Square Gold Syndicate in the Murray district reported down 465 feet.

Solarium or artificial sunlight treatments at the Bunker Hill and Sullivan open for the fall and winter season.

New equipment installed at the property of the Riverside Copper Mines Company on Little North Fork.

OCTOBER

Mineral Mountain installs electric power running line from Polaris substation.

A gold nugget worth $150 found in Prichard Creek near Murray by Charles Lafon and Emmett Allan.

Coeur d'Alene district mining men organize company to develop property in the Gibbonsville district.

District suffers greatest mine disaster when 10 men met death in Morning Mine shaft.

Rufus E. Dunlap, 77, pioneer placer miner of Murray, died at a local hospital. Came to Murray in 1884.

Sunshine four-compartment shaft reaches the 1900-foot level.

Metropolitan cuts vein on 400 level of shaft.

Shaft at the Crescent Mine of the Bunker Hill reaches 400-foot level.

Construction work on 300-ton mill for the Polaris Mine gets under way.

Mill located at mouth of Silver Summit tunnel.

Mines of Idaho have produced more than a billion dollars worth of ore.

Callahan Zinc-Lead Company installs electric power at Vulcan tunnel.

Lead price advances to $4.80.
November

Harry Pearson completes nearly two miles of tunnel under contract for Polaris Company.

Archie Smith, veteran placer miner, and 50 years a partner of Rufe Dunlap, dies on his 82nd birthday.

Wage increase of 50 cents per day announced by operators in the district. Miners will receive $5.75 and muckers $5.25 per shift.

Sunshine Mining Company declares dividend of 75 cents per share totaling $1,116,615 as the disbursement for the fourth quarter of the current year.

Star Mine ceases production until new mill under construction is ready to receive ore.

Price of lead advanced to $5.20 per hundred and zinc quoted at $5.05.

Bunker Hill and Sullivan announces twice a month paydays instead of three paydays each month starting in January.

December

Sunshine shaft at 2100 level and will be continued to 2500 level, it was announced.

Bunker Hill Mine at Kellogg now employing 1600 men in its varied operations.

Manager Joe Grismer announces enlarged program for the development of the Superior Silver property at Keystone.

Polaris shaft completed to the 1500 level. Grismer Brothers made an average of 5.3 feet per day in sinking the shaft.

Dividends paid by Coeur d’Alene mining companies, 1886 to 1937, total $151,981,586.

Silver Bar officials let contract for 280 feet of crosscut.

Announce plans for resumption of operations at Silver Cable property. Lead advances to $6.00 per hundred, highest price in six years. Zinc quoted at $5.45 per hundred.

Aetna Mines Corporation


Aetna Mining & Milling Co., Ltd.


Ajax Mining Company


Alhambra Mining Co., Ltd.

ALICE MINING CO.

ALAMEDA MINING CO.

ALMA RAY MINING CO.

ALPENA COPPER MINING CO., LTD.

ALTURA MINING CO.

AMAZON MANHATTAN MINING CO.

AMBERGRIS CONSOLIDATED MINING CO.

AMERICAN LEAD MINES, LTD.
AMERICAN MINING CO., LTD.

AMERICAN SILVER MINING COMPANY

AMERICAN SMELTING AND REFINING CO.
Office: 120 Broadway, New York. Officers: Simon Guggenheim, Pres.; G. A. Brockington, Sec., both of New York; H. G. Washburn, Mgr., 516 Bank St., Wallace. Inc.: New Jersey.Filed in Idaho May 15, 1934. Capital: 500,000 shares 7% preferred; par value $100; 200,000 shares 6% second preferred; par value $100; 4,000,000 shares common; no par value; all 7% preferred issued; 184,000 shares 6% second preferred issued; 1,829,940 shares common issued. Property: Property of Jack Waite Mining Co., 35 patented claims and 120 unpatented, Eagle dist.; Duthie, held under operating agreement. Development: Approximate total development, 26,515 ft. Ore: Lead, zinc and silver. Men Employed: Average, 53. Remarks: 1469 ft. of development work during the year. Rebuilt timber framing shed, blacksmith shop, change room, power house, and 800 ft. of snow shed that was destroyed by fire in 1935. New boarding house and bunkhouse to cost approximately $12,000.00 now under construction.

ANACONDA COPPER MINING CO.

ASSOCIATED MINES CORPORATION, LTD.

ATLANTIC MINING CO.

ATLAS MINING CO.
ATLAS X CO.

AURORA MINING CO.

BASIN MINING CO.

BEAN CREEK PLACER MINING CO., INC.

BEAR PLACER MINING CO.

BEAVER CREEK MINING CO.

BELL MINING CO.

BELL OF THE WEST MINING CO.
BELMONT MINING CO., LTD.

BENTON MINING CO., LTD.

BETTY LOU MINING COMPANY

BIG CREEK MINING CO., LTD.

BIG DIVIDE MINING CO., LTD.

BIG ELK MINING CO., LTD.

BIG IT MINING & MILLING CO.

BISMARCK MINING CO.

BITTER ROOT MOUNTAIN MINING CO.
SHOSHONE COUNTY

BLACK BEAR MINING CO.

BLACK HAWK MINING & DEVELOPING CO., LTD.

BLAINE & EMMETT MINING CO., LTD.

BLUE EAGLE MINING CO.

BLUE RIBBON MINING CO.

BLUE STAR MINING & MILLING CO., LTD.

BLUE WING MINING CO., LTD.

BOBBY ANDERSON GROUP MINING CO.
Office: Kellogg. Officers: T. R. Mason, Pres.; Richard Cripe, Sec., both of Kellogg. Inc.: June 16, 1906. Capital: 1,500,000 shares; par value $1; March 25, 1929, increased to 2,000,000 shares; par value $1; 540,000 shares issued. Property: Bobby Anderson group; 16 unpatented claims, Yreka dist.; Kellogg. Development: Principally by 1 tunnel 1300 ft. long and an inclined shaft 100 ft. long. Plant: Electrically driven compressor and hoist; complete mining equipment and camp. Ore: Lead-silver. Remarks: Idle.

BULLFROG SILVER LEAD MINING CO.
BULLION MINING CO., LTD.


BUNKER CHANCE MINING CO.


BUNKER HILL & SULLIVAN MINING & CONCENTRATING CO.

Office: Kellogg. Officers: Stanly A. Easton, Pres.-Mgr., Kellogg; J. W. Crosby, Sec., 1022 Crocker Bldg., San Francisco, Calif. Inc.: Originally incorporated in Oregon and filed in Idaho, Aug. 20, 1903; changed to a Delaware corporation and filed in Idaho, Apr. 16, 1924. Capital: 327,000 shares common; par value $10; 20,000 shares preferred; par value $100; 6889 shares preferred, and all common shares issued. Property: Bunker Hill; 373 patented, 31 unpatented claims, Yreka dist.; Kellogg. Development: The principal adit is the Kellogg tunnel, which is 31,300 ft. long, in which are the two principal inclined shafts, one of which is known as the White Raise, and the other the main shaft, which is approximately 2785 ft. long, giving a vertical depth of 2000 ft. below the Kellogg tunnel level, and a 560 ft. winze-shaft on the 1900 ft. level, which opens the ore bodies an additional depth of 400 ft. In the main shaft are 13 intermediate levels. Total development, approximately 65 miles. Plant: MINE: 2 electrically driven hoists; 2 electrically driven 1-R compressors; 1 steam-driven Nordberg compressor. Trolley locomotive haulage in Kellogg tunnel; storage-battery locomotive haulage in intermediate levels. Complete and modern machine shop, blacksmith shop, and change house. MILL: 4 complete and modern concentrators, including flotation: Sweeny mill, capacity 300 tons, accommodates custom ores, particularly those from Pine Creek; West mill, capacity 1200 tons, treats output from the Bunker Hill Mine; South mill, capacity 600 tons, treats output from Star Mine of Sullivan Mining Co.; Crescent mill on Big Creek, capacity 100 tons, treats output from Crescent and Alhambra mines. Ore: Lead-silver. Men Employed: In mines, mills, and smelter, average, 1500.

BUNKER HILL SMELTER

Officers: Frank M. Smith, Director, 1117 Paulsen Bldg., Spokane, Wash.; A. F. Beasley, Supt., Kellogg. Remarks: This smelter was erected during 1917, since which time it has been continually enlarged and improved and is now one of the most modern, complete and up-to-date plants in the United States. The smelting plant covers an area of about 30 acres and consists of complete buildings and equipment for sampling, roasting, sintering, smelting and refining lead, silver and gold ores. During 1929 its capacity was doubled, in anticipation of the termination on Feb. 1, 1930, of the company's smelting contract with the American Smelting & Refining Co., to whom the Bunker Hill was obliged to ship one-half of its production. In addition to refined lead, silver and gold, antimonial lead and copper sulphate are also produced. The principal supply of ore is from the company's own mine and the mines of the Coeur d'Alene district. The company is doing a general custom business and is drawing ore from all of the northwestern states as well as from British Columbia and Alaska, and is becoming a strong competitor in the smelting business. This smelter and its operations are fully described and illustrated in many of the articles listed under the bibliography of Shoshone County. The enlargements and modernization, commenced in 1929, were fully completed in 1931. The smelter output for 1936, as a result of increased receipts of company and custom ore is rapidly reaching capacity production.
BURKE MINING CO., LTD.

BUTTE & COEUR D'ALENE DEVELOPMENT CO.

CALABRIA MINING CO.

CALEDONIA MINING CO.

CALEDONIA SILVER-LEAD MINING CO.

CALLAHAN ZINC-LEAD CO.

CALLAHAN MINE
Property: Interstate-Callahan group; 81 patented, 2 unpatented claims, Beaver dist.; Interstate. Development: Principal development is main transportation tunnel, which is 5500 ft. long, and a three-compartment vertical shaft 2000 ft. deep; total development, approximately 10 miles. Plant: MINE: Two single-drum air-driven hoists and one 250 h. p. electrically driven double-drum hoist; three large I-R electrically driven compressors; trolley locomotive haulage in main tunnel; complete and modern blacksmith shop, machine shop, sawmill, mine equipment, camp and company buildings. MILL: 600-ton concentrator, including flotation. Ore: Zinc-lead-silver.

GALENA MINE
CARBONATE MINING & MILLING CO.

CENTRAL MINING CO.

CHESTER MINING CO., LTD.

CINCINNATI MINING CO.

CLEAR GRIT MINING CO., LTD.

THE CLEARWATER GOLD & COPPER MINING CO., LTD.

CLIMAX SILVER MINING CO.

COEUR D'ALENE BIG CREEK MINING CO.

COEUR D'ALENE MINING CO.
COEUR D'ALENE CRESCENT MINING CO.

COEUR D'ALENE LEAD CO.

COEUR D'ALENE METALS CO.

COEUR D'ALENE MINES CORPORATION

COEUR D'ALENE MINING CO.

COEUR D'ALENE MINING & SMELTING CO.

COEUR D'ALENE SYNDICATE MINING CO.

CONSOLIDATED INDEPENDENT CALUMET MINING CO.
CONSOLIDATED MINING CORPORATION

COPPER CHIEF MINING CO.

COPPER KING MINING & SMELTING CO.

C. & R. MINING CO.

CRYSTAL LEAD MINES CO.

CUBA MINING CO.

DAY DEVELOPMENT CO.

DAYROCK MINING CO.
Office: Wallace. Officers: F. M. Rothrock, Pres., Spokane, Wash.; S. F. Heitfeld, Sec.; Henry L. Day, Mgr., both of Wallace. Inc.: Nov. 30, 1923, as Strattons Mines Co.; name changed Nov. 19, 1928. Capital: 2,000,000 shares; par value 10c; 1,708,958 shares issued. Property: Dayrock, Panhandle, and Monarch-Bonanza groups; 38 patented, 12 unpatented claims, Placer Center dist.; Wallace. Development: Dayrock group; principally by 1 tunnel 1612 ft. long, in which is an inclined shaft 460 ft. long, with 4 intermediate levels, which opens the vein to a vertical depth of 400 ft. Panhandle group: Principally by 1 tunnel 1582 ft. long, and an inclined shaft 360 ft. long, with 3 intermediate levels, which opens the vein to a vertical depth of 253 ft. Total development in both groups, more than 36,000 ft. Plant: Electrically driven hoist and 2 electrically driven compressors; complete mining equipment; storage-battery locomotive and haulage. Ore: Lead-silver. Remarks: Some work by lessees.
DECKER DEVELOPMENT CO.

DEEP WONDER MINE

DELAWARE MINES CORPORATION

DICKENS-EAST MINING CO.

DICKENS MINING COMPANY

DOBSON PASS LEAD AND SILVER MINES CORP.

DOUGLAS MINING CO., LTD.

DULUTH MINING CO.

EAST ALAMEDA MINING CO., LTD.
EAST CALEDONIA MINES CO.

EASTERN STAR MINING CO., LTD.

EAST HECLA MINING CO., LTD.

EAST STANDARD MINING CO.

ECHO MINING CO., LTD.

ELDORADO MINING & SMELTING CO., LTD.

ENTERPRISE MINING CO.

EQUITABLE MINING & MILLING CO.

EVOLUTION MINING CO.
SHOSHONE COUNTY  245

FANNIE GRIMM MINING CO.

FEDERAL MINING & SMELTING CO.
Office: Wallace. Officers: F. H. Brownell, Pres.; J. L. Martin, Sec., both of New York City; H. G. Washburn, Mgr., Wallace. Inc.: Filed in Idaho, Sept. 24, 1903. Capital: 200,000 shares preferred, 100,000 shares common; par value of each $100; June 6, 1934, decreased preferred to 30,000 shares, and common to 50,000 shares, par value of each $100; 28,474 shares preferred and 49,328 shares common issued.

FRISCO GROUP
Property: 15 patented claims, Lelande dist.; Gem. Development: Principally by 4 tunnels; No. 1, 1000 ft. long; No. 2, 1500 ft. long; No. 3, 550 ft. long; No. 4, 1000 ft. long; and a vertical 4-compartment shaft 1650 ft. deep; total development, approximately 31,680 ft. Ore: Lead-zinc-silver. Remarks: Some work by lessees.

GLAMORGAN GROUP

GOVERNMENT GULCH GROUP
Property: Five-sixteenths interest in 1 patented claim, Yreka dist.; Kellogg. Development: Principally by 1 tunnel, which is 500 ft. long; total development, approximately 1700 ft. Ore: Lead-silver.

CON. BIEDEMAN GROUP

MACE GROUP
Property: 35 patented claims, Lelande dist.; Mace. Development: Principal development consists of No. 6 tunnel, 3600 ft. long; No. 2, Campbell, 3000 ft. long; and a 3-compartment vertical shaft 2400 ft. deep, with 22 intermediate levels; total development, approximately 18,000 ft. Plant: MILL: Almost entirely dismantled. Ore: Silver-lead. Men Employed: 1 watchman. Remarks: Some work by lessees.

BURKE GROUP

MORNING GROUP
Property: 41 patented claims, Hunter dist.; Mullan. Development: The two principal tunnels are No. 5, 1800 ft. long, and No. 6, the main transportation tunnel, 9500 ft. long. The principal shaft, which is located in No. 6 tunnel, is a vertical, 4-compartment shaft, 3200 ft. deep, with 14 intermediate levels below No. 6 tunnel, which opens the vein to a depth of approximately 5220 ft. Total development, approximately 37 1/2 miles. Plant: MINE: 1 double-reel hoist, arranged for electric drive by means of direct-current hoist motor 600 h. p. 450 r. p. m., through single reduction herringbone gear, driven by synchronous motor generator (motor 700 h. p.; generator 500 kw. direct current) 1200 r. p. m. 265 volts; one 600 h. p. electrically driven double-drum Nordberg hoist; one Nordberg single-drum geared hoist, driven by 300 h. p. electric motor; one water-driven 6200 cu. ft. Rix compressor; one Laidlaw-Dunn-Gordon 3200 cu. ft. compressor, two Ingersoll-Rand 2500 cu. ft. compressors, and
one Prescott pump, 400 gal. capacity, on 2450 level, all electrically driven; complete mining equipment, machine shops, sawmill, company buildings and hotel. HAULAGE: 500-volt electric in main, or No. 6 tunnel; 250-volt electric and 10 storage-battery locomotives on intermediate levels. MILL: 1200-ton concentrator, fine grinding flotation; two ore-sorting plants; and complete modern change house. Ore: Lead-silver-zinc. Men Employed: Average, 433. Remarks: 1585 ft. of development work during the year. New hoisting equipment for offset shaft on 3850 level to be installed.

SURFACE PLANT, PAGE MINE, FEDERAL MINING AND SMELTING CO.

PAGE GROUP

Property: 86 patented claims, Yreka dist.; Kellogg. Development: By 10 tunnels, the principal one of which is the Curlew, 650 ft. long; and an inclined shaft 1571 ft. long, giving a vertical depth of 1208 ft., with 5 intermediate levels; total development, approximately 27,946 ft. Plant: MINE: A 100 h. p. hoist and a 75 h. p. double-drum hoist, both electrically driven; a 400 cu. ft., an 800 cu. ft. and a 2550 cu. ft. electrically driven compressor; 1 trolley locomotive and 3 storage-battery locomotives; complete and modern mine camp, equipment and buildings. MILL: 300-ton flotation concentrator. Ore: Lead-zinc-silver. Men Employed: Average, 79. Remarks: 390 ft. of drifting during the year.

FLORENCE MINING & MILLING CO., LTD.

SHOSHONE COUNTY

FLYNN GROUP MINING CO.

FORMOSA LEAD MINING CO., LTD.

FOUR SQUARE GOLD SYNDICATE

GALENA MINING CO.
Office: Wallace. Officers: A. H. Featherstone, Pres.; Herman Marquardt, Sec., both of Wallace. Inc.: Not filed in Idaho. Capital: 3,000,000 shares; par value $1; 2,000,000 shares issued. Property: Idaho Galena group; 5 patented, 7 unpatented claims, Placer Center dist.; Wallace.

GEM STATE MINING CO.

GENERAL MINES CORPORATION

GERTIE MINING CO.

GIANT MINING & DEVELOPMENT CO.

GLOBE SILVER MINES, INC.
GOLCONDA EXTENSION MINING CO.

GOLCONDA LEAD MINES

GOLDEN CHEST MINING AND CONCENTRATING CO.
Office: Murray. Officers: Herman J. Rossi, Pres., Wallace; Ruth Hodges, Sec., Murray. Inc.: Aug. 10, 1934. Capital: 3,000,000 shares; par value 10c; 1,332,628 shares issued. Property: Gold Hunter; 12 patented claims, Hunter dist.; Mullan. Development: Principal main haulage tunnel 7600 ft. long, from which level is a shaft 1500 ft. deep to the 1200 ft. level, in which there is another shaft 600 ft. deep. Plant: Complete and modern; electric hoist; two 3000 cu. ft. electrically driven compressors; pumps; machine and blacksmith shop; electric haulage. MILL: 500-ton concentrator, including flotation. Ore: Lead-silver. Remarks: Expect to install new 10 drill compressor and all necessary mining equipment to handle 100 tons per day.

GOLD HUNTER MINES, INC.

GOODENOUGH MINING CO.

GOVERNMENT GULCH MINING CO.

GRANADA LEAD MINES, INC.
MAIN HOIST, HECLA MINING CO.

GREAT EASTERN MINING CO., LTD.

GREAT HELENA MINING & MILLING CO.

GREEN HILL CLEVELAND MINING CO.

HAPPY DAY MINING CO., LTD.

HAYDEN HILL CONSOLIDATED MINING CO.
Office: 417 Symons Bldg., Spokane, Wash. Officers: W. J. Stratton, Pres.; W. W. Smith, Sec., both of Spokane. Inc.: Mar. 27, 1931, as Strattons Mines Cons.; name changed, Apr. 6, 1934. Capital: 10,000,000 shares non-assessable common; par value 5c; 20,000,000 shares class “A” common stock; par value 5c; 7,531,140 shares non-assessable and 16,865,013 shares class “A” stock issued. Property: Purim group; 5 unpatented claims, Evolution dist. Remarks: Principal active operation is Hayden Hill Gold Corporation in Lassen County, California.
HECLA MINING CO.
Office: Wallace. Officers: James F. McCarthy, Pres.-Mgr.; Leo J. Hoban, Sec., both of Wallace. Inc.: Sept. 26, 1898. Capital: 1,000,000 shares; par value 25c; all shares issued. Property: 48 patented claims, 10 unpatented, Lelande dist.; Burke. Development: Principally by a 4-compartment vertical shaft, which is 2800 ft. deep, and a 3-compartment vertical shaft from the 2000 ft. level, which is 800 ft. deep. Plant: MINE: 2 electrically driven I-R compressors, totaling 7500 cu. ft., housed in steel and concrete buildings; one of the largest, most complete and modern mine plants in the United States; 2 electrically driven hoists, the main one being driven by a 2100 h. p. motor. MILL: 900-ton concentrator, including flotation. Ore: Lead-silver. Men Employed: Average, 392. Remarks: 2417 ft. of development work during the year.

HELMER SILVER MINES COMPANY

HERCULES MINING CO.
HERCULES GROUP

Property: Hercules group, 41 claims, Lelande and Placer Center dists.; Burke.

Development: Principally by 5 tunnels: No. 1, 280 ft. long; No. 2, 3350 ft. long; No. 3, 3900 ft. long; No. 4, 5900 ft. long; No. 5, 8550 ft. long; and a 4-compartment vertical shaft 1300 ft. deep, with 8 intermediate levels; total development, approximately 18 miles. Plant: MINE: Special first motion double-reel Nordberg electric hoist, direct connected to 700 h. p. motor; one 22x16 I-R and one 29x21 I-R compressor, both electrically driven; electric trolley locomotive in main transportation tunnel and storage-battery locomotives in intermediate levels; complete and modern mine equipment and shops. MILL: 900-ton concentrator, including flotation. See Idaho Thirty-first Ann. Rept. Min. Industry, 1929, pp. 23-27, for complete description. Ore: Lead-silver. Remarks: Idle.

MAHER-HEARN GROUP

Property: 39 patented claims, Lelande dist.; Burke. Development: Through 4500 ft. tunnel of Gertie Mining Co., at the end of which are more than 4000 ft. of tunnel and a 400 ft. vertical shaft. Plant: Electrically driven 1000 cu. ft. I-R compressor; air driven hoist; trolley electric locomotive haulage; complete and modern equipment. Ore: Lead-silver. Remarks: Idle.

HIDDEN TREASUREMINING CO.


HIGHLAND-SURPRISE CONSOLIDATED MINING CO.


HILL MINING & MILLING CO.


HORNSILVER MINING & MILLING CO.


HORSHOESOKE MINING CO.


HUMMING BIRD MINING CO.

HYPOTHEEK MINING & MILLING CO.

IDAHO COPPER MINING CO., LTD.

IDAHO & EASTERN MINING & MILLING CO., LTD.

IDAHO-LEADVILLE MINES CO.

IDAHO & LOS ANGELES MINING & MILLING CO.

IDAHO-MONTANA AND ORLANDO CONSOLIDATED MINING CO.

IDAHO MOTHER LODE GOLD MINES, INC.

IDAHO STAR MINING CO.
SHOSHONE COUNTY

IDORA MINING CO., LTD.

IMPERIAL MINING CO.

INDEPENDENCE LEAD MINES CO.
Office: Wallace. Officers: H. B. Kingsbury, Pres.-Mgr.; Herman Marquardt, Sec., both of Wallace. Inc.: Filed in Idaho, Nov. 12, 1929. Capital: 4,000,000 shares; par value $1; 3,240,000 shares issued. Property: Independence group, 13 patented claims; American Commander group, 7 patented claims; Hunter dist.; Mullan. Development: By 4 tunnels: No. 1, 100 ft. long; No. 2, 300 ft. long; No. 3, 1,200 ft. long; No. 4, 6000 ft. long. Independence group: Principally by 4 tunnels: No. 1, 100 ft. long; No. 2, 300 ft. long; No. 3, 1,200 ft. long; No. 4, 6000 ft. long. Ore: Lead-silver. Men Employed: Average, 6. Remarks: Property in development stage with present work all on 500 ft. shaft level prospecting for downward extension of bodies of ore disclosed in upper workings. 1000 ft. of development work during the year.

INDEPENDENCE MINING CO., LTD.

INDIAN CREEK GOLD MINING CO.

INLAND EMPIRE MINING & MILLING CO.

INSPIRATION LEAD CO., INC.

INTERNATIONAL MINES, LTD.
IONE MINING CO.

IVANHOE MINING CO., LTD.

JACK WAITE MINING CO.

JIM BLAINE SILVER SYNDICATE, LTD.

JUNO MINES CORP.

KENNAN MINING CO.

KING OF PINE CREEK MINING CO.

KING'S PASS GOLD COMPANY, INC.

LACLEDE MINING CO., LTD.
LANSING SILVER-LEAD MINING CO.

LEAD BLOSSOM MINING & MILLING CO.

LEROY GOLD & COPPER CO., LTD.

LEWIS & CLARK MINING CO.

LEXINGTON MINING CO.

LIBERAL KING MINING CO.

LINCOLN MINING CO.
Office: Wallace. Officers: Theodore Wellman, Pres., Wallace; Earl Elstone, Sec., Dudley. Inc.: July 9, 1923. Capital: 1,500,000 shares; par value 10c; May 7, 1928, increased to 2,000,000 shares common; par value 10c; 30,000 shares preferred; par value $10; 1,122,946 shares common, 2750 shares preferred issued. Property: Silverado group; 36 unpatented claims, Evolution dist.; Osburn. Development: Principally by 1 tunnel, 7800 ft. long and an inclined shaft 570 ft. long, giving a vertical depth of 550 ft. with 4 intermediate levels. Plant: MINE: 500 cu. ft. electrically driven compressor; complete mining equipment. MILL: 50-ton concentrator, including flotation. Ore: Lead-zinc-silver. Remarks: Property leased to Silver Dollar Mining Company.

LINFOR COPPER CO.
LITTLE BUTTE MINING CO.  

LOG CABIN MINING & MILLING CO., LTD.  

LOMBARDY MINING & MILLING CO.  

LON CHANEY MINING & MILLING CO.  

LONG WAIT MINING CO.  

LUCKY BOY MINES CORPORATION  

LUCKY BOY MINING & CONCENTRATING CO., LTD.  

MAINE-STANDARD MINING CO., LTD.  

MAJESTIC MINING CO., LTD.  
MARSH MINES CONSOLIDATED  

McGREGOR MINING CO.  

MERGER MINES CORPORATION  
Office: Wallace. Officers: Walter H. Hanson, Pres.; R. C. Russell, Sec., both of Wallace. Inc.: Filed in Idaho, March 3, 1931. Capital: 3,000,000 shares; par value $1; Nov. 4, 1936, reduced capital stock from $3,000,000 to $490,000, divided into 3,900,000 shares common; par value 10c, and 100,000 shares preferred stock, par value $1; amount issued, not given. Property: Bear Top group; 11 patented claims, Summit dist.; Murray; Aetna group; 2 patented, 22 unpatented claims, Evolution dist.; Osburn. The company reported: "This company holds possessory title to the Aetna group of lode claims and owns the controlling interest in the Bear Top group." Development: Bear Top group: Principally by 3 tunnels: No. 1, 100 ft. long; No. 2, 625 ft. long; No. 3, 2600 ft. long. Aetna group: By 9 tunnels, the longest being No. 9, 750 ft. long. Plant: Bear Top group; MINE: Small gas-driven compressor; complete mine camp. MILL: 100-ton concentrator; jigs and tables. Constructed about 1900. Remarks: Report not filed for 1936.

MERRY WIDOW MINING CO.  

METROPOLITAN MINES CORPORATION, LTD.  
Office: Wallace. Officers: R. L. Brainard, Pres., Wardner; Roy H. Kingsbury, Sec., Wallace. Inc.: Nov. 21, 1929. Capital: 1,000,000 non-assessable common shares, par value 10c; Oct. 24, 1935, increased non-assessable stock to 1,250,000 shares; 2,000,000 assessable common shares, par value 10c; 1,000,000 non-assessable shares and 1,731,352 assessable issued. Property: Sterling Silver group; 38 unpatented claims, Big Creek, Evolution dist.; Kellogg. Development: Principally by 1 tunnel 4800 ft. long. Plant: Anaconda hoist, 5½x5½ and 10x12 G-D electrically driven compressor; complete mining equipment and camp. Ore: Lead-silver. Men Employed: Average, 7. Remarks: Added hoisting plant and sinking pump. Shaft was completed to 200 level and 345 ft. of work on 200 level in crosscutting and drifting. (This information based on 1935 report.)

MILITARY MINING & MILLING CO., LTD.  
MINERAL FARM MINING CO., LTD.

MINERAL MOUNTAIN MINING & MILLING CO.

MINERAL POINT MINING CO.

MISSOULA COPPER MINING CO.

MOE MINING CO., LTD.

MOHAWK MINING CO.

MONARCH METALS CO.

MOONLIGHT MINING CO.

MOUNTAIN CON MINING CO., INC.
MOON CREEK MINING CO.

MOUNTAIN QUEEN MINING CO.

MULLAN MINING CO.

MURRAY HILL MINING CO.

MUTUAL MINES DEVELOPMENT CO.

NABOB SILVER LEAD CO.

NATIONAL COPPER MINING CO.

NEVADA STEWART MINING CO.

NEW HOPE MINING CO., LTD.
MINING INDUSTRY OF IDAHO

NEW JERSEY CONSOLIDATED MINES CO.
Officers: W. J. Stratton, Pres.; W. W. Smith, both of Spokane, Wash. Inc.: June 20, 1928. Capital: 5,000,000 shares; par value 10c; 1,291,478 shares issued.

KING OF PINE CREEK GROUP
Property: King of Pine Creek group; 6 patented, 3 unpatented claims and 160 acres patented land, held under lease and option from King of Pine Creek Mining Co., Yreka dist.; Kellogg. Development: By 2 tunnels: No. 1, 380 ft. long; No. 2, 350 ft. long, and a vertical shaft 300 ft. deep. Plant: Hoist and 2 I-R compressors, all electrically driven; complete mining equipment. Ore: Lead-zinc-silver. Remarks: Idle.

NEW JERSEY GROUP
Property: New Jersey group; 6 patented claims, held under lease and option from Dubois Mining Co., Big Creek, Yreka dist.; Kellogg. Development: Principally by 1 tunnel 1500 ft. long. Remarks: Idle.

NIAGARA PLACER MINING CO.

NINE MILE MINING CO.

NORTH AMERICAN MINING & MILLING CO., LTD.

NORTH BUNKER HILL MINING CO., LTD.

NORTH IDAHO MINING CO.

NORTH STAR MINING CO.

NORTH STAR MINING & DEVELOPMENT CO.
NORTHERN LIGHT MINING & MILLING CO.

NORTHWEST MINING & MILLING CO.

OASIS MINING CO.

OLD GOLD MINES CORPORATION

OOM PAUL CONSOLIDATED MINING CO.

OREGON TRAIL MINING COMPANY

PACIFIC MINING & MILLING CO.

PARADISE MINES ASSOCIATION

PARAMOUNT MINES CORPORATION
PARK COPPER & GOLD MINING CO., LTD.

PATUXENT MINING CO.

PEARSON MINING CO.

PINE CREEK LEAD-ZINC MINING CO.

PINE CREEK QUEEN, INC.

![THE DRY BELT OF THE COEUR D'ALENE](https://example.com/dry-belt.jpg)

FAMOUS "DRY ORE" BELT OF THE COEUR D'ALENE

(Courtesy Best & Bradshaw)
PIONEER GOLD MINING & DEVELOPMENT CO.

PIONEER MINING CO., LTD.

PLAINVIEW MINING CO., INC.

POLARIS DEVELOPMENT & MINING CO.
Office: Wallace. Officers: James F. McCarthy, Pres.-Mgr.; Bert P. Woolridge, Sec., both of Wallace. Inc.: Dec. 10, 1915. Capital: 1,000,000 shares; par value 5c; increased Nov. 22, 1917, to 1,500,000 shares; par value 5c; increased May 4, 1925, to 1,500,000 shares; par value $1; increased July 28, 1930, to 2,000,000 shares; par value $1; decreased Aug. 30, 1930, to 2,000,000 shares; par value 25c; all shares issued. Property: Polaris group; 3 patented claims, Big Creek, Yreka dist.; Kellogg. Development: Approximate total development, 7753 ft. Plant: Electrically driven compressor and complete mining equipment. Ore: Lead-silver. Men Employed: Average, 25. Remarks: 3860 ft. of development during the year. Cookhouse remodeled and new bunkhouse built.

E DISTRICT FROM POLARIS PEAK

COEUR D'ALENES, SHOSHONE COUNTY
Studios, Wallace, Idaho.)
PONTIAC MINING CO.

PRITCHARD MINING & LEASING CO.

PROGRESS GOLD MINING CO.

PURITAN MINING CO., LTD.

RAINBOW MINING & MILLING CO., LTD.
(See Benewah and Kootenai counties.)

RAMONA MINING CO.

RAVEN MINING CO., LTD.

RAY JEFFERSON MINING CO.

RED CLOUD MINING CO.
REINDEER-QUEEN MINING CO.

RHODE ISLAND MINING CO., LTD.

ROANOKE MINING CO., LTD.

ROB ROY MINING CO.

RUTH CONSOLIDATED MINING & MILLING CO.

ST. ELMO SILVER MINES CORPORATION

ST. JOE LEAD & SILVER MINES CO.

SAINT LOUIS & IDAHO MINING & MILLING CO.

SAMSON MINING & DEVELOPMENT CO., LTD.
SAN FRANCISCO MINING CO., LTD.

SAVAGE MINING CO.

SHADOW PEAK MINING CO.

SHERMAN LEAD CO.
Office: Wallace. Officers: Jerome J. Day, Pres.; S. F. Heitfeld, Sec., both of Wallace. Inc.: Nov. 4, 1918. Capital: 3,500,000 shares; par value 25c; Aug. 27, 1928, increased to 3,675,000 shares, par value 25c; all shares issued. Property: Sherman and Oreano groups; 9 patented claims, Lelande dist.; Burke. Development: Total development, more than 31,000 ft., consisting principally of Sherman No. 5 tunnel, 5943 ft. long; Sherman No. 6 tunnel, 2000 ft. long; Oreano No. 2 tunnel, 7400 ft. long; and two 1070 ft. inclined raises connecting Sherman No. 6 tunnel and Oreano No. 2 tunnel, in which are 8 intermediate levels. Plant: 2 electrically driven hoists, trolley locomotive haulage, and all mining equipment furnished by Hercules Mining Co. Ore: Lead-silver. Remarks: Idle.

SHRINE MINING CO.

SIDNEY LEASING CO.

SIDNEY MINING CO.

SIERRA NEVADA CONSOLIDATED MINING CO.
Office: Kellogg. Officers: Stanley A. Easton, Pres.-Mgr.; C. W. Simmons, Sec., both of Kellogg. Inc.: May 21, 1887. Capital: 1,000,000 shares; par value $1; all shares issued. Property: Sierra Nevada group; 5 patented claims, Yreka dist.; Kellogg. Development: Principally by 4 tunnels: No. 1, 4550 ft. long; No. 2, 275 ft. long; No. 3, 700 ft. long; No. 4, 625 ft. long; total development, approximately 10,000 ft. Ore: Lead-silver. Remarks: Idle.
SILVER BAR MINING COMPANY

SILVER CLIFF GOLD & COPPER MINING CO., LTD.

SILVER CRESCENT MINING CO.

SILVER DALE & BIG HILL MINING CO.

SILVER DOLLAR MINING CO.
Officers: Wm. J. Straton, Pres.; W. W. Smith, Sec., both of Spokane, Wash. Inc.: Feb. 6, 1929 as Stratton Silver Summit, Inc., name changed June 6, 1934. Capital: 10,000,000 shares; par value 1c; 9,895,600 shares issued. Property: 35 claims, Evolution dist., some of which are held under lease and option. Development: Principally by 1 tunnel 6000 ft. long. Plant: 550 cu. ft. I-R electrically driven compressor; steel sharpener; complete mining equipment. Ore: Lead-silver. Men Employed: Average, 12. Remarks: 2500 ft. of development during the year. In addition to drifting on Sunshine vein company is preparing to sink 1000 ft. shaft on Polar's vein.

SILVER LODE MINING & MILLING CO.

SILVER MOON MINING CO., LTD.

SILVER REEF MINES, INC.
SILVER STRIKE MINING COMPANY

SILVER STAR-QUEENS MINES, INC.

SILVER SUMMIT MINING CO.

SILVER SYNDICATE, INC.

SISTER MINING & MILLING CO., LTD.

SMUGGLER CONSOLIDATED MINING CO.

SNOWSHOE MINING CO.
Office: Wallace. Officers: Walter H. Hanson, Pres.; Herman Marquardt, Sec., both of Wallace. Inc.: Sept. 30, 1903. Capital: 2,000,000 shares; par value $1; 260,000 shares issued. Property: Snowshoe; 8 patented claims, Hunter dist.; Mullan. Development: Approximately 4000 ft. of workings, the principal of which are No. 2 tunnel, 3000 ft. long, and No. 1 tunnel, 900 ft. long. Plant: Electrically driven 3-drill compressor. Ore: Copper-silver. Remarks: Idle.
SONORA MINING & MILLING CO.

SPOKANE TUNNEL MINING CO.

SQUARE DEAL MINING & MILLING CO., LTD.

STANDARD GROUP

STANLEY MINING CO.

STERLING MINING CO., LTD.

SUCCESS MINING CO., LTD.

SULLIVAN MINING CO.
Office: Wallace. Officers: Stanly A. Easton, Pres.; C. W. Simmons, Sec., both of Kellogg. Inc.: May, 22, 1917. Capital: 500,000 shares; par value $3; 37,448 shares issued. Property: Star group; 31 patented claims, Lelande dist.; Burke. Development: By a crosscut, known as the "Star crosscut," which is on the 2000 ft. level of the Hecla Mine and is 8900 ft. long; and by one 2300 ft. vertical raise and one 2850 ft. vertical raise. Plant: MINE:

SUNRISE MINES CO.

SUNSHINE CONSOLIDATED, INC.

SUNSHINE MINING CO.

SUNSHINE MINING CO., LTD.

SYNDICATE MINING & EXPLORATION CO., LTD.

TAMARACK & CUSTER CONSOLIDATED MINING CO.
Office: Wallace. Officers: Jerome J. Day, Pres.; Henry Lawrence Day, Sec., both of Wallace. Inc.: Aug. 6, 1912. Capital: 5,000,000 shares; par value $1; all shares issued. Property: Tamarack & Custer; 60 patented, 2 unpatented claims, Lelande and Placer Center dists.; Gem. Development: The three principal tunnels are: No. 5, 12,300 ft.; No. 6 (400 ft. level), 8900 ft. long; and No. 7 (1200 ft. level), 11,300 ft. long. The principal shaft is a 3-compartment, vertical shaft, 600 ft. deep; a 3-compartment raise 800 ft. long connecting No. 6 and No. 7 tunnels; and a 150 ft. vertical winze (1350 ft. level) from No. 7 tunnel. Total development, approximately 14 miles. Plant: MINE: 100 h. p. electrically driven hoist; three 1300 cu. ft. electrically driven compressors; storage-battery haulage on intermediate levels and trolley-locomotive haulage on main levels; complete mining equipment; modern and complete machine shop; modern hotel, change house, and camp. Ore: Lead-zinc-silver. Remarks: Lessees and maintenance only.
SURFACE PLANT: SUNSHINE MINING COMPANY

(Courtesy Rinker's Studio, Kellogg, Idaho.)
TEDDY MINING & MILLING CO., LTD.

THOMAS MINES, INC.
Office: Wallace. Officers: Herman J. Rossi, Pres.; Otto A. Olsson, Sec.-Mgr., both of Wallace. Inc.: Jan. 8, 1904, as Iron King Mining Co., Ltd.; name changed July 19, 1935. Capital: 1,000,000 shares; par value $1; July 19, 1935, increased capital stock to 2,000,000; reduced par value to 10c; 1,073,500 shares issued. Property: More than 1500 ft. of tunnels, the principal one of which is approximately 1500 ft. long. Ore: Lead and silver. Remarks: Idle.

TIBERIUS MINING CO.

TRADE DOLLAR MINING CO., LTD.

TRAPPER CREEK SILVER MINING CO.

TREASURE VAULT MINING CO., LTD.

TUSCUMBIA MINING CO., LTD.

UNITED AMERICAN MINES CO., LTD.

UNITED METALS CO.

UNITED MINES & METALS CORPORATION
UNITED STATES SILVER LEAD MINES CO.

VENDETTA CHIEF MINING CO.

VICTOR MINING CO.

VIENNA-INTERNATIONAL MINING & MILLING CO., LTD.

VINDICATOR MINING CO.

WALLACE IDAHO LEAD MINES, INC.

WALLACE MINING COMPANY

WALLACE SILVER-LEAD MINES COMPANY

WALL STREET MINING CO.
WASHINGTON-IDAHO MINING CO.
Office: 707 Hutton Bldg., Spokane, Wash. Officers: Dr. James Murray, Pres., Hayden Lake; Dennis P. Woods, Sec., Spokane, Wash. Inc.: Oct. 21, 1927. Capital: 2,500,000 shares; par value $1; 1,769,149 shares issued. Property: Crescent group; 23 unpatented claims, Moon Creek, Yreka dist.; Kellogg. Development: By 3 tunnels, the principal one of which is 1320 ft. long, and a vertical shaft 376 ft. deep, in which are 3 levels. Plant: Electrically driven I-R compressor and complete mining equipment. Ore: Lead-zinc-silver. Remarks: Idle.

WASHINGTON MINING CO.

WEST BELL MINING CO., LTD.

WEST GEM MINING CO.

WEST HECLA MINING CO.

WESTERN PACIFIC MINING CO.
Office: P. O. Box 282, Sanger, Calif. Officers: J. Fred Markwell, Sec., Los Angeles, Calif. Inc.: Apr. 6, 1922; charter forfeited Nov. 30, 1929. Capital: 2,500,000 shares; par value 1c; all shares issued. Property: South Side group; 9 patented and 5 unpatented claims, Lelande dist.; Wallace. Development: Principally by 2 tunnels: No. 3, 3035 ft. long; No. 4, 8237 ft. long; and a vertical shaft 477 ft. deep, with 4 intermediate levels; total development, approximately 21,349 ft. Plant: I-R and Gardner-Rix electrically driven compressors; air-driven hoist; complete mining equipment and camp. Ore: Lead-silver. Remarks: Idle.

WESTERN UNION MINING CO.

WILLOW CREEK MINING CO.
SHOSHONE COUNTY

WISCONSIN MINING CO.

WOLVERINE MINING CO., LTD.
Office: 304 Lindelle Bldg., Spokane, Wash. Officers: C. C. Harrington, Pres.; Harold M. Gleeson, both of Spokane, Wash. Inc.: Aug. 4, 1909. Capital: 1,250,000 shares; par value $1; increased on July 11, 1928, to 2,000,000 shares; 1,702,176 shares issued. Property: Wolverine group; 7 unpatented claims, Big Creek, Yreka dist.; Kellogg. Development: By 3 tunnels, the longest being 400 ft. long; and an inclined shaft 400 ft. long. Plant: Hoist, 1 Sullivan and 1 I-R compressor, all electrically driven; complete mining equipment. Ore: Lead-silver. Remarks: Maintenance only.

WONDERFUL MINING CO., LTD.

WYOMING MINING & MILLING CO., LTD.

YAKIMA-SHOSHONE MINING CO.

NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
---|---|---|---
American Placer | Summit | Joseph Laveigne | Murray
Anchor et al. | Summit | Mike Melley | Murray
Ancient Gravel | Yreka | Geo. H. Heller Est. | Kellogg
Birthday Gr. | St. Joe | Wes. J. Horsky | Falcon
Bismark Lode | Eagle | Robt. T. Horn Est. | Murray
Black Hill | Beaver | John Thiard Est. | Delta
Blue Eagle Gr. | Yreka | Walter Owens | Kellogg
Blue Grouse | Evolution | C. M. Patterson | Wallace
Bonanza | Eagle | Jas. Boland | Murray
Boulder Placer | Eagle | Clay Giles Est. | Murray
Bull Pine | Evolution | O.J. Holtz | Kellogg
Carney Copper | Hunter | James Carney | Mullan
Carruthers Placer | Eagle | E. N. Harwood | Billings, Mont.
Castle Rock et al. | Placer Center | A. C. Livingston | Wallace
Comstock Gr. | Lelande | J. H. Smith | Wallace
Corby Group | Yreka | Corby Lodes Mg. Co. | Kellogg
Cornucopia | Eagle | Francis Frohling Est. | Murray
Cougar Gr. | Yreka | Geo. Smith | Kellogg
Creighton Gr. | Hunter | Mrs. S. P. Domer | Spokane, Wash.
Daddy Mining Co. | | Robt. T. Horn Est. | Murray
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TETON COUNTY

County Seat: Driggs. Area: 463 sq. miles. Population: 3573. Principal Industries: Agriculture, live stock and mining. Transportation: Ashton-Victor branch of Oregon Short Line. Teton State highway and an excellent system of county roads. Mineral Resources: Coal, phosphate rock, natural gas, limestone and asbestos. There are excellent possibilities for the discovery of petroleum. This is one of the few counties in the State that has beds of commercial coal.

Review of Year's Operations

Mr. H. F. Samuels rehabilitated the property of the Gem State Coal Mining Company, near Driggs. A crew of 15 men is employed in the production of coal that is marketed by trucks.
GRAND TETON OIL CO.
Office: Earl Bldg., Idaho Falls. Officers: Geo. W. Edgington, Pres., Idaho Falls; Leo F. Smith, Sec., Seattle, Wash. Inc.: Aug. 9, 1928. Capital: 250,000 shares; par value $1; April 12, 1930, increased to 1,000,000 shares; 786,000 shares issued. Property: Oil and gas lease on 13,000 acres patented and government land lying 11 miles west of Driggs. Development: Blevins No. 1 well, 3100 ft. deep; Bevan No. 1 well, 1815 ft. deep. Plant: 2 complete well-drilling rigs and equipment. Mineral Sought: Oil and gas. Remarks: Report not filed for 1936.

IDAHO COAL & COKE, INC.

SUPERIOR COAL MINING CO.

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TWIN FALLS COUNTY


MINERAL RECOVERIES, INC.
VALLEY COUNTY

County Seat: Cascade. Area: 3779 sq. miles. Population: 3488. Principal Industries: Agriculture, stock raising, lumbering and mining. Transportation: State Highway up Payette River, the McCall-Warren-Edwardsburg-Yellow Pine-Landmark-Cascade Loop and Cascade-Bear Valley road, as well as numerous forest service roads and trails. The only railroad is the McCall branch of the Union Pacific. Relief: The county, as a rule, is high and rugged with few level spaces along the many rivers. The Payette Lakes, the largest in southern Idaho, occur at the head of the Payette River, occupying the upper end of the only large valley in the county. Mineral Resources: Gold, lead, silver, zinc, mercury, copper, tungsten, molybdenum and monazite. On account of the very difficult problem of transportation the mineral resources of this county have received scant development. Until recent years, only the placer and free lode gold could be successfully handled.

The building of roads by the forest service has been accompanied by a corresponding development in mining and this county is fast becoming one of the foremost mining districts of the state. It has great possibilities and presents many opportunities to the prospector, operator and investor.

Review of Year's Operations

Copper Cliffs Mining Company completed 51 feet of development work during the year.

Rapid Creek Mining Co., Ltd., extended one of their two tunnels a distance of 10 feet.

The Yellow Pine Company at Stibnite is the largest operation in Valley County. This property led the state in the production of gold for 1936. The crew will average 56 men. Supplies are trucked in from Cascade and concentrates are shipped from that point. In winter transportation is by airplane. The ore is antimony-gold. One thousand six hundred eight feet of new development work and prospecting with diamond drill was accomplished during the year. Lloyd C. White is in charge of operations at the mine.

Thunder Mountain Mining and Milling Company with the cooperation of the Forestry Department built a road from Monumental Creek to the mine. A. H. Sperry, president, E. A. Sperry, secretary, both of Spokane, Washington, plan to reopen the Sunnyside Mine, build a mill of 100-ton capacity and be producing during 1937.

Daniel C. McRea and son, of Yellow Pine, worked some placer ground on the south side of Thunder Mountain. These men formerly worked the Sunnyside Mine.

The Profile Yellow Pine Company, Inc., under the management of F. C. Innes, did some development and prospected with diamond drill.

Idaho Minerals Company had a crew of seven men throughout the year on development work. J. J. Oberbillig, Boise, is president and manager. Ore is gold-silver-antimony.

The Heller Bros. of Boise did annual labor only at their property near Garden Valley. The group consists of five unpatented claims known as Warm Springs Lode Mining Corporation. Richard D. Heller, president, Leland S. Heller, secretary.

This district is tapped by an unimproved dirt road built and maintained by the county. Landing fields are located at Cascade, Yellow Pine, Stibnite and Edwardsburg.

AMALGAMATED RED METALS MINES CO.
ANTIMONY GOLD ORES CO.

BIG CREEK GOLD MINES, INC.

BIG LEDGE GOLDMINES COMPANY

CASCADE VALLEY CORPORATION

COPPER CAMP MINING CO.

COPPER CLIFFS MINING CO.

DEADWOOD MINING CO., LTD.

GOLD FORKS MINING CO.

HALL INTERSTATE MINING CO.

HOLCOMB CO., LTD.
IDAHO MINERALS CO.

INDEPENDENCE MINES & POWER CO.

KEYSTONE GOLD MINES, INC.

LOST PILGRIM MINING CO.
Office: Boise. Officers: James H. Hawley, Jr., Pres.; Chas. W. Mack, Sec., both of Boise. Inc.: Nov. 22, 1921. Capital: 600,000 shares; par value $1; 365,144 shares issued. Property: Lost Pilgrim group; 8 patented claims, Deadwood dist.; Knox. Development: By 2 tunnels: No. 1, 400 ft. long; No. 2, 300 ft. long; and 1 vertical shaft 40 ft. deep, at the bottom of which is a 70 ft. drift; also by Independence tunnel; total development, approximately 2,500 ft. Ore: Silver-lead-zinc. Remarks: Idle.

LUCKY LAD MINING COMPANY

MARY JANE MINING CO., LTD.

PADDY FLAT PLACER MINING CORP.

PROFILE-TAMARACK MINES CO.

PROFILE YELLOW PINE COMPANY, INC.
RAPID CREEK MINING CO., LTD.

SMITH CREEK HYDRAULIC MINING CO., INC.

SOUTH SALMON PLACER MINING CO.

THUNDER MOUNTAIN MINING AND MILLING COMPANY

UNITED MERCURY MINES CO.

VENABLE MINING COMPANY, INC.

WARM SPRINGS LODE MINING CORPORATION

YELLOW PINE CO.
Office: 922 Crocker Bldg., San Francisco, Calif. Officers: P. R. Bradley, Pres., E. A. Griffen, Sec., both of San Francisco; Lloyd C. White, Mgr., Stibnite. Inc.: Filed in Idaho, May 25, 1928. Capital: 200,000 shares; par value $1; 62,605 shares issued. Property: Meadow Creek mine; 9 patented and 518 unpatented claims, Yellow Pine dist.; stibnite. Development: By 6 tunnels, the principal one being 7364 ft.; approximate total development to date, 24,447 ft. Plant: Mine: Meadow Creek Camp: 12x10 I-R compressor and Ottumwa hoist, both electrically driven; steel sharpener; oil furnaces; sawmill; complete mining equipment and camp. Monday Camp: One 500 cu. ft. 12x10 I-R compressor; one 620 cu. ft. Imperial type I-R compressor, Roots positive blower; all electrically driven; steel sharpeners; oil furnaces; storage battery locomotive haulage; complete mining equipment and machine shop; complete and modern mine and camp buildings. MILL: 175-ton fine grinding flotation followed by cyanidation. POWER: South Meadow Creek hydroelectric plant, 75 kw., driven by Pelton water wheel under a 520 ft. head, water delivered through an 11,000

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<td>Dorothy E. Fowler, Adm., Cascade</td>
</tr>
<tr>
<td>Valhalla et al.</td>
<td>Yellow Pine</td>
<td>C. J. Fisk</td>
<td>Stibnite</td>
</tr>
<tr>
<td>Wolverine et al.</td>
<td>Yellow Pine</td>
<td>Ed Hintz</td>
<td>Stibnite</td>
</tr>
<tr>
<td>Warm Springs Gr.</td>
<td>Yellow Pine</td>
<td></td>
<td>Idaho Mineral Co., Boise</td>
</tr>
</tbody>
</table>

**BIBLIOGRAPHY**

See pages 102-103 for publisher's address, meaning of reference marks and abbreviations.


Geology of Thunder Mountain and central Idaho, by R. N. Bell: Eng. and Min. Jour., vol. 73, pp. 791-793, June 7, 1902.§


Big Creek gold district, Idaho, by R. N. Bell: Eng. and Min. Jour., vol. 94, pp. 891-892, Nov. 9, 1912.§
"Thunder Mountain Mining District," by Clyde P. Ross, vol. 28, No. 6, Economic Geol., 1933.

WASHINGTON COUNTY

County Seat: Weiser. Area: 1,479 sq. miles. Population: 7,962. Principal Industries: Agriculture, stockraising and mining. Transportation: North and South Highway, Oregon Trail and well maintained county roads. The railroads serving the county are: The Oregon Short Line main line and Huntington-Robinette branch and the Pacific and Idaho Northern. Rivers: Snake River forms western boundary and Weiser River flows southwesterly through the center of the county. Mineral Resources: Silver, copper, gold, lead, zinc, manganese, diatomaceous earth, pyrites, gypsum, clay, garnets and natural gas. History and Future: Nearly all of the mineral resources occur in the mountain ranges that lie east of the Snake River. The principal district is known as the Mineral District and at one time had two blast furnaces in operation and was a large producer of silver. The district has been dormant for many years, however, and has almost reverted to its primitive condition. Nearly all of the ores are high-grade silver-copper ores, rather complex, but can be handled by modern flotation methods.

This district is one well worthy the attention of the operator and investor.

MIDVALE OIL & GAS CO.

SILVER STILL MINING CO.

WEISER GAS & PETROLEUM CO.
### NAME OF MINE | MINING DIST. | OWNER | P. O. ADDRESS
--- | --- | --- | ---
Alcorn Gr. | Cuddy Mt. | J. I. Burden | Council
Copper Bell Gr. | Washington | J. R. Weaver | Home, Ore.
Copper King Ext. | Heath | H. H. Mack | Baker, Ore.
Cuddy Mtn. Gr. | Cuddy Mt. | W. E. Freehafer | Council
Darius Gr. | Cuddy Mt. | Mrs. J. G. Burnham | Home, Ore.
Edna May | Heath | Roy Howland | Homestead, Ore.
Fernwood | Heath | Wm. Ulrich | Huntington, Ore.
Iron Mt. Gr. | Washington | John Seigwein | Weiser
Jonsail | Heath | E. C. Jones | Huntington, Ore.
Keystone | Cuddy Mt. | G. T. Hamill | Fruitvale
Last Chance Gr. | Cuddy Mt. | Frank Peck | Council
L. T. Claim | Cuddy Mt. | L. J. Thibault | Council
Magdalene Gr. | Washington | J. R. Weaver | Home, Ore.
No Business | | | |
Canon | Cuddy Mt. | Levander | Fruitvale
Pin Money Gr. | Mineral | F. J. Kennedy | Council
Porcupine Gr. | Cuddy Mt. | J. T. Morris | Council
Raymond | Heath | Raul Raymond, Sr. | Heath
Rinehart Gr. | Cuddy Mt. | Rinehart & | Bloomfield
River Bank Gr. | Cuddy Mt. | Earl Kerr | Council
S. & R. Gr. | Cuddy Mt. | Summencamp & Riley Payette | |
Sunshine Idaho Gr. | Cuddy Mt. | H. A. Arnold | Council
View of the Valley | Heath | J. H. Schlehuber | Cambridge

### BIBLIOGRAPHY

See pages 102-103 for publisher's address, meaning of reference marks and abbreviations.


Companies Incorporated During 1934—Reports Not Yet Filed

NAME
American Rand Mines Co.
Gold King M. & M. Co.
Reliance M. Co.
Snake River Coal Gas & Oil Co.
Surprise Gold M. Inc.

OFFICER
B. X. Dawson
J. M. Howell, Sec.
James Jameson
U. G. Stevens
Lee Herman

P. O. ADDRESS
Spokane, Wash.
Fine, Ida.
Boise, Ida.
Payette, Ida.
Lewiston, Ida.

Companies Incorporated During 1935—Reports Not Yet Filed

NAME
Fisher & Sons, E. M.
Grangeville Gold Corp.
Independence Placers, Inc.
Minnie Moore Mine Dev. Co.
Montgomery Mines, Inc.
Payette Gold Mines Inc.
Portland M. & M. Co.
Silver Bell Mines Inc.
Silver Cable Mining Co., Inc.
Vail Coal Mining Co.
Voltuff Products Co.

OFFICER
E. M. Fisher
Nick Kokot
Wm. G. Fraser
Wm. J. Stratton
W. E. Wheelan
Chas S. Woodward
Robert T. Jacobs
F. D. Ames
G. W. Ringel
R. B. Ewart
Dr. A. V. Strauss

P. O. ADDRESS
Craigmont, Ida.
515 E. 24th Ave.,
Spokane, Wash.
Fahle Hotel,
Wallace, Ida.
Spokane, Wash.
Bonners Ferry, Ida.
Salt Lake City, U.
Portland, Ore.
Yakima, Wash.
Kellogg, Ida.
Idaho Falls, Ida.
New Plymouth, Ida.

Companies Incorporated During 1936—Reports Not Yet Filed

NAME
Beryl Metals Company
Birthday Cons. Gold Mines, Inc.
Brandon Gold Fields, Inc.
Butcher Bar Gold Placers, Inc.
Cons. Gold Quartz Mines Corp.
Copper Mountain Mines, Inc.
Corby Mining Company
Dewey Mines, Incorporated
Dominion Mines, Inc.
Dry Lake Oil Company
Elk City Gold Mines, Inc.
Elk Creek-Spanish Town Mines, Inc.

OFFICER
Robt H. Briscoe,
Sec.
R. W. Edmunds
Frank A. Heller,
Vice-Pres.
L. H. House
W. G. Tanner, Pres.
E. H. Anderson
L. E. Franks,
Pres.
Eugene Best
Irene Comer, Sec.
Horton B. G. Abell
Mrs. H. Warren, Sec.
C. L. Romig

P. O. ADDRESS
E. 1235 34th Ave.,
Spokane, Wash.
1024 Kearns Bldg.
Salt Lake City
E.1216 Newark Ave.
Spokane, Wash.
Lewiston, Idaho
828 16th Ave.,
Seattle, Wash.
Mt. Home, Idaho
618 W. Gordon Ave.,
Spokane, Wash.
Coeur d'Alene, Ida.
304 Arts Bldg.,
Vancouver, Wash.
Nampa, Idaho
Spokane, Wash.
Twin Falls, Idaho
NAME
El Oro Placers, Inc.

Em Quad, Inc.

Far West Gold-Silver M. Co.

Fidelity Investment Corp.

Gibbonsville Mining & Exp. Co.

Globe Development Co.

Gold Creek Placer Mining Co.

Gold Cross Mining Co.

Gold Dollar Mines, Inc.

Gold Eagle Mining Co., The Gold, Inc.

Golden West Dredging Corp.

Gold Warrior Custom Mining and Milling Corporation

Green-Hill Mining Corp.

Grimes Homestake Gold Mines Cons.

Haywire Mining & Milling, Inc.

Heidelberg Mining Co. of Montana, Inc.

Idaho Basin Mining Company

Idaho Lime-Phosphate, Inc.

Idaho-Oregon Gas Company

Idaho Travertine Lime Co., Inc.

Lost River Mining Co.

Malgre Mining Co.

McFadden Mines Corp.

Montrose Mines, Inc.

Musselshell Mining Co.

Nancy Lee Mines, Inc.

National Gold Mining Co.

Palisade Petroleum Co.

Peoples Gas and Oil Co. of Idaho

Proctor Knott M. Co.

Rose Mining & Milling Co.

Sandy Creek Mining Co., Ltd.

Sheep Creek Mining Corp.

Silver Crescent, Inc.

The Snyder Mines, Inc.

Spokane Dredging and Mining Co.

Teton Coal Company, Inc.

The Tri-State Mining Co.

West States Mines, Inc.

Western Gold Corporation

OFFICER
Olga Albi, Sec.

A. M. Olson

J. L. Vig, Inc.

R. C. Pauley, Sec.

Philo Seelye,

Dr. A. V. Strauss

Elmer E. Johnston

J. A. Blair, Pres.

E. H. Anderson

Jas. A. Kesgard

E. W. Wheelan

J. W. Galloway

E. H. Anderson

Roy Green, Inc.

R. W. Edmunds

Frank Speece,

J. A. Carlisle, Sec.

Horton B. G. Abell, Sec.

J. W. Gwinn

Theresa A. Reisinger

P. C. O’Malley

W. S. Gorman

Merna E. Eggers

E. J. McKanna, Sec.

Frank J. Kraeman

Bernard O’Connor

R. L. Brainard

J. W. Fryett

Dr. H. Ray Hatch

M. G. Whitney

Edward R. Taylor, Sec.

E. F. Rose

Lot L. Feltham, Sec.

John Kinsela

Phillip H. Hinkley

Guy Snyder, Sec.

R. L. Dickerson

H. F. Samuels

T. Pleasant Jones

Richard E. Harper, Sec.

Earl W. Murphy, Inc.

P. 0. ADDRESS
Kuhn Bldg.,

Spokane, Wash.

Salt Lake City, Utah

Rt. 2,

Coeur d’Alene, Ida.

Boise, Idaho

Kellogg, Idaho

New Plymouth, Ida.

714 W. 14th,

Spokane, Wash.

S. 823 Monroe St.

Spokane, Wash.

Mt. Home, Idaho

Emmett, Idaho

Sandpoint, Idaho

Boise, Idaho

Mt. Home, Idaho

Grangeville, Idaho

Salt Lake City, Utah

Bonnier’s Ferry, Ida.

Tacoma, Wash.

Boise, Idaho

Boise, Idaho

Minneapolis, Minn.

Boise, Idaho

St. Anthony, Idaho

2507 Lyndale Ave.,

No., Minneapolis, Minn.

Yakima, Wash.

R. F. D. 5,

Spokane, Wash.

62084 60th Place,

Ridgewood,

Queens, Long Island, N. Y.

Kellogg, Idaho

Boise, Idaho

Idaho Falls, Idaho

Coeur d’Alene, Ida.

1377 Dexter Horton Bldg., Seattle,

Wash.

Portland, Oregon

Salmon, Idaho

Boise, Idaho

1201 W. 1st Ave.,

Spokane, Wash.

218 Felt Bldg., Salt Lake City, Utah

E. 1206 33d Ave.,

Spokane, Wash.

Samuels, Idaho

Bovill, Idaho

423 Eastman Bldg.,

Boise, Idaho

Boise, Idaho
## Corporations Not Owning Property In Idaho

<table>
<thead>
<tr>
<th>NAME</th>
<th>OFFICER</th>
<th>P. O. ADDRESS</th>
</tr>
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<tbody>
<tr>
<td>Belmont Copper Corp.</td>
<td>Peter C. Warwick, Jr.</td>
<td>907 W. Grace St.,</td>
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<tr>
<td></td>
<td></td>
<td>Richmond, Va.</td>
</tr>
<tr>
<td>Buckhorn Mining Co.</td>
<td>J. R. Davies</td>
<td>225 Noble Bldg.,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boise, Idaho</td>
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<tr>
<td>DeLamar Mines of Mont., Inc.</td>
<td>C. R. Bernard</td>
<td>Imlay, Nev.</td>
</tr>
<tr>
<td>Four Square Gold, Inc.</td>
<td>H. J. Hull, Pres.</td>
<td>Wallace, Idaho</td>
</tr>
<tr>
<td>Golden West Dredging Corp.</td>
<td>Wm. McIntosh, Pres.</td>
<td>Buhl, Idaho</td>
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<tr>
<td>Happy Jack Mining Co., Inc.</td>
<td>H. M. Holler, Sec.-Treas.</td>
<td>Twin Falls, Idaho</td>
</tr>
<tr>
<td>Humphreys Gold Corp.</td>
<td>A. E. Humphreys</td>
<td>1130 First Nat'l Bank Bldg.,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Denver, Colo.</td>
</tr>
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<td></td>
<td></td>
<td>Spokane, Wash.</td>
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<td>Idaho Lead-Silver Mines Co.</td>
<td>E. B. Muna, Sec.</td>
<td>Troy, Idaho</td>
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<td>Kalso Mines Corp.</td>
<td>H. G. Loop, Pres.</td>
<td>Missoula, Mont.</td>
</tr>
<tr>
<td>Little Mint Mining Co.</td>
<td>L. L. Bulen, Pres.</td>
<td>Wallace, Idaho</td>
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<tr>
<td>Mammoth Mining Co.</td>
<td>A. H. Featherstone, Pres.</td>
<td>Kellogg, Idaho</td>
</tr>
<tr>
<td>Mountain City Copper Co.</td>
<td>Rom Warburton, Treas.</td>
<td>Salt Lake City, Utah</td>
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<tr>
<td>Silver Bowl, Inc.</td>
<td>Lester S. Harrison, Sec.-Treas.</td>
<td>Caldwell, Idaho</td>
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<tr>
<td>Southern Gold Mines Corp.</td>
<td>D. W. Henderson,</td>
<td>Kellogg, Idaho</td>
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<tr>
<td>Tri-State Dev. Co., Inc.</td>
<td></td>
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</tbody>
</table>

### WINTER TRANSPORTATION
Twelve Pertinent Facts About Mining In Idaho

1. There are 250 mines in the State of Idaho which does not include inactive properties, but of course, includes any properties that are not necessarily productive or dividend-paying, but do employ a large number of men.

Dr. Finch of the United States Bureau of Mines at Washington, D.C., together with Francis A. Thomson, President of the Montana School of Mines, and Dean Fahrenwald of the University of Idaho, have all declared that Central Idaho holds the greatest potential gold supply in undeveloped ground that can be found anywhere within the borders of the United States.

It is now evident that Central Idaho is the "Mecca" of the gold miner, for in the year 1935, this area produced $1,376,500.00 in newly mined gold. Sixty-two (62) per cent of this was taken from old established properties, and thirty-eight (38) per cent or more than a half million dollars came from new properties in 1935.

From twelve new quartz operations came $352,700, and from five new placer operations came over $30,000. From numerous other small placer and quartz mines, there was taken over $150,000.00. Hence, you will see how important the mining industry is to Central Idaho and other sections of the State by providing a home market for farm products.

2. In the year 1935, this State produced more than $20,000,000.00 worth of gold, silver, copper, lead, zinc, antimony, phosphate, and fire clay products, as disclosed by official records on file in Boise.

3. In producing this $20,000,000.00 worth of metals, there were employed more than 5000 miners, smelter and mill men, and 1075 loggers and lumbermen—all engaged in mining.

4. An estimate indicates that in the Coeur d'Alene district in the year 1935 (1936 figures not available), there was paid out for labor over five and a half million dollars. Prevailing wages in the Coeur d'Alene district during 1935 for miners was $5.25. The present scale for miners is $5.75, however, this scale of wages is not uniform throughout the State.

5. Our figures indicate there are 84 separate communities in Idaho dependent upon mining, with a combined population of over 35,000 people, all of whom consume farm products.

It is evident that the mining industry has made a valuable contribution to the present return to normal conditions now evident in the State and in the country at large.

6. Minerals enter into practically every phase of our civilization and furnish the raw material for an amazing proportion of our industry. Among the industries by-product to minerals are: Motion pictures, tableware, cooking utensils, automobiles, batteries, railroad rails and coaches, wire, roofing and building materials, printing, chemicals, plumbing, ink, paints—in fact practically every phase of human existence, human necessity, comfort or luxury.

7. The Idaho Mining Industry in the year 1935 paid $598,223.00 in State and county taxes, which does not include any net profit taxes, but simply covers taxes assessed against the industry for surface plant, buildings, and equipment used in mining operations.

In addition to the State and County taxes, the industry paid the Federal Government $578,000.00 as Federal taxes, making a total State, county, and Federal tax of more than one million dollars paid by the mining industry.

8. There were paid by the mines of Idaho, taxes to the United States Government, or national taxes, the amount of $578,203.00.

9. From the Public Utilities Commission who compile data on carloads of all commodities terminating on rail lines or originating on rail lines within the State of Idaho, we received the information that there was a grand total of 87,835 carloads of mining material which terminated on rail lines within
the State for the year 1935, and 152,716 carloads originating on rail lines within the State.

10. We refer you to the mineral exhibit in the rotunda of the State Capitol Building on the ground floor for ores, flow sheets and general information on the mining industry, which is by far the most important single industry in the State in the employment of men, taxes paid, and wealth produced.

11. In 1935 there were 42 new mining developments started on which there was sufficient showing made to justify the building of 20 new mills or concentrators. In addition to the new mills, there were seven (7) new gold dredges placed in operation, all of which will appear on our assessment rolls for taxation purposes for the year 1936.

12. The two hundred fifty mining companies who reported 1935 figures purchased $3,497,740.00 worth of supplies which included many farm products. The year 1936 will undoubtedly disclose that mining companies alone have purchased more than four and one-half million dollars ($4,500,000.00) worth of supplies. While the bulk of these supplies may have been manufactured or raised outside of Idaho, it is evident the mining industry has made a valuable contribution to recovery from the depression.

Approximate Quantity and Retail Value of Farm Products Consumed by 5000 Miners of Idaho and Their Families, Making a Total of Approximately 16,000 People During an Average Year

<table>
<thead>
<tr>
<th>FRUIT (Canned):</th>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loganberries</td>
<td>4,896 Gals.</td>
<td>$4,651.00</td>
</tr>
<tr>
<td>Peaches</td>
<td>55,450 Lbs.</td>
<td>$44,360.00</td>
</tr>
<tr>
<td>Pears</td>
<td>65,962 Lbs.</td>
<td>$56,059.00</td>
</tr>
<tr>
<td>Plums and Prunes</td>
<td>4,896 Gals.</td>
<td>$3,152.00</td>
</tr>
<tr>
<td>Apricots</td>
<td>45,504 Lbs.</td>
<td>$43,230.00</td>
</tr>
<tr>
<td>Apples</td>
<td>44,352 Lbs.</td>
<td>$28,830.00</td>
</tr>
<tr>
<td>Cherries</td>
<td>34,952 Lbs.</td>
<td>$29,708.00</td>
</tr>
<tr>
<td>Rhubarb</td>
<td>4,896 Gals.</td>
<td>$2,938.00</td>
</tr>
</tbody>
</table>

Total: 260,898 Gals. $212,958.00

<table>
<thead>
<tr>
<th>FRUIT (Evaporated):</th>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>49,920 Lbs.</td>
<td>$7,488.00</td>
</tr>
<tr>
<td>Apricots</td>
<td>40,000 Lbs.</td>
<td>$8,000.00</td>
</tr>
<tr>
<td>Prunes</td>
<td>160,000 Lbs.</td>
<td>20,800.00</td>
</tr>
<tr>
<td>Peaches</td>
<td>40,000 Lbs.</td>
<td>7,200.00</td>
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</table>

Total: 289,920 Lbs. $43,488.00

<table>
<thead>
<tr>
<th>FRUIT (Fresh):</th>
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<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>15,000 Bu.</td>
<td>$13,500.00</td>
</tr>
<tr>
<td>Peaches</td>
<td>7,000 Bu.</td>
<td>7,700.00</td>
</tr>
<tr>
<td>Pears</td>
<td>4,000 Bu.</td>
<td>5,600.00</td>
</tr>
<tr>
<td>Plums</td>
<td>3,000 Bu.</td>
<td>4,500.00</td>
</tr>
<tr>
<td>Cherries</td>
<td>3,000 Bu.</td>
<td>6,000.00</td>
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</table>

Total: 32,000 Bu. $37,300.00

<table>
<thead>
<tr>
<th>VEGETABLES (Canned):</th>
<th>Quantity</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Beans (Cut, String)</td>
<td>25,056 Gals.</td>
<td>$16,286.00</td>
</tr>
<tr>
<td>Beets</td>
<td>21,600 Gals.</td>
<td>14,040.00</td>
</tr>
<tr>
<td>Corn</td>
<td>50,400 Gals.</td>
<td>40,320.00</td>
</tr>
<tr>
<td>Peas</td>
<td>26,400 Gals.</td>
<td>23,760.00</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>1,152 Gals.</td>
<td>691.00</td>
</tr>
</tbody>
</table>

Total: 110,514 Gals. $187,347.00
### 296 MINING INDUSTRY OF IDAHO

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Lbs.</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinach</td>
<td>19,296</td>
<td>16,400.00</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>68,540</td>
<td>47,978.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>212,444</td>
<td><strong>$ 159,475.00</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VEGETABLES (Fresh):</th>
<th>Lbs.</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabbage</td>
<td>499,200</td>
<td>9,984.00</td>
</tr>
<tr>
<td>Carrots</td>
<td>379,200</td>
<td>9,480.00</td>
</tr>
<tr>
<td>Garlic</td>
<td>4,416</td>
<td>662.00</td>
</tr>
<tr>
<td>Onions</td>
<td>480,000</td>
<td>7,200.00</td>
</tr>
<tr>
<td>Parsnips</td>
<td>144,000</td>
<td>3,600.00</td>
</tr>
<tr>
<td>Potatoes</td>
<td>2,680,000</td>
<td>40,200.00</td>
</tr>
<tr>
<td>Rutabegas</td>
<td>160,000</td>
<td>4,800.00</td>
</tr>
<tr>
<td>Turnips</td>
<td>80,000</td>
<td>2,000.00</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>175,000</td>
<td>17,500.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,601,816</td>
<td><strong>$ 95,426.00</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MEAT:</th>
<th>Lbs.</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Beef</td>
<td>3,033,600</td>
<td>455,040.00</td>
</tr>
<tr>
<td>Pork</td>
<td>765,600</td>
<td>176,088.00</td>
</tr>
<tr>
<td>Bacon</td>
<td>408,000</td>
<td>134,640.00</td>
</tr>
<tr>
<td>Ham</td>
<td>647,000</td>
<td>207,040.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,854,200</td>
<td><strong>$ 972,808.00</strong></td>
</tr>
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<table>
<thead>
<tr>
<th>MISCELLANEOUS:</th>
<th>Lbs.</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Beans</td>
<td>280,000</td>
<td>14,000.00</td>
</tr>
<tr>
<td>Butter</td>
<td>504,000</td>
<td>171,360.00</td>
</tr>
<tr>
<td>Cheese</td>
<td>96,000</td>
<td>24,000.00</td>
</tr>
<tr>
<td>Eggs</td>
<td>20,800</td>
<td>187,200.00</td>
</tr>
<tr>
<td>Flour</td>
<td>11,200</td>
<td>78,400.00</td>
</tr>
<tr>
<td>Milk (Condensed)</td>
<td>40,000</td>
<td>132,000.00</td>
</tr>
<tr>
<td>Rolled Oats</td>
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**TOTAL**                           |       | **$2,296,085.00**

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**Purchases of Silver By U. S. Treasury**

The mint bureau's annual report showed the treasury paid an average of 64.8 cents a fine ounce for silver during the last fiscal year. This was 9.5 cents over the average New York open market price for the year.

Government silver acquisitions for the period ending last June 30, totaled 609,613,258 fine ounces at a cost of $395,313,736. Of the purchases 558,639,669 ounces were acquired under the silver purchase act and 48,784,455 were newly mined domestic silver.

Gold acquisitions by mints and assay offices during the year aggregated $1,451,011,081, of which $27,495 was acquired under the act requiring surrender of domestic gold holdings.

The treasury department paid $20.67 per fine ounce for the surrendered domestic gold and on the $27,495 purchase the increment to the statutory price of $35 per fine ounce gave a $19,081 profit.

Industrial consumption of gold during the calendar year 1935 was estimated at $25,929,497—larger than for any other country in the world. The return of gold to the treasury from industrial use, however, totaled $32,461,178, a reversal of the usual trend.
The output of gold, silver, copper, lead, and zinc from mines in Idaho in 1935, in terms of recovered metals, was 83,882 fine ounces of gold, 10,241,778 fine ounces of silver, 2,096,095 pounds of copper, 158,072,370 pounds of lead, and 62,195,031 pounds of zinc. This output compares with a production in 1934 of 84,817.20 ounces of gold, 7,394,143 ounces of silver, 1,531,625 pounds of copper, 142,648,216 pounds of lead, and 49,598,651 pounds of zinc. The total value of the output in 1935 was $19,530,600 compared with $15,277,669 in 1934, an increase of $4,252,931.

The output of gold, silver, copper, lead, and zinc in Idaho in 1935 were the decrease in the output of gold from the Middle Boise district, Elmore County, the increase in the output of gold from dredging operations, the unusual increase in the output of silver from the Yankee Boy mine of the Sunshine Mining Co., the decided increase in the output of lead-zinc ore from the Morning and Page mines of the Federal Mining & Smelting Co., and the large gain in the production of zinc from the property of the Bunker Hill & Sullivan Mining & Concentrating Co.

Gold.—The output of recoverable gold in Idaho in 1935 decreased only 935 ounces from the output in 1934. All the decrease came from lode mines, as the output from placers, especially from dredging operations, increased more than 4,500 ounces. The largest decrease in the output of gold was reported by the St. Joseph Lead Co., operating the Boise-Rochester property at Atlanta, and the output of the Yellow Pine Co. at Stibnite also declined. The largest increase in the output of gold came from the Gold Hill (Talache) mine at Quartzburg. Nine floating dredges were working in Idaho in 1935 compared with five in 1934. New floating dredges were constructed at the Wharton property near Centerville by the Grimes Co. near Idaho City, and by the Jordan Creek Placers near Silver City. The Idaho Gold Dredging Co. (two dredges) and the Warren Creek Dredging Co. operated their plants near Warren all year, and the dredges of the Gold Dredging, Inc., at Pierce, the Little Smoky Dredging Co. near Fairfield, and the Mount Vernon Mining Co. at Elk City were operated part of the year.

The total production of gold recovered by nine bucket dredges in 1935 was 23,640 ounces, a decided increase from 15,852 ounces from five dredges in 1934; the placer output recovered by other methods was 8,130 ounces, a decrease of 3,274 ounces. The production of gold from lode mines in 1935 was 52,112 ounces compared with 57,560.83 ounces in 1934. A decrease of more than 8,000 ounces of gold from the St. Joseph Lead property was partly offset by increases at the Gold Hill, Golden Anchor, Placer Basin, Homestake (Penman), Orogrande-Frisco, and Grunter mines. The largest producers of gold in Idaho in 1935 were the St. Joseph Lead Co. (Boise-Rochester mine) at Atlanta, Idaho Gold Dredging Co. at Warren, Yellow Pine Co. at Stibnite, Warren Creek Dredging Co. at Warren, Gold Hill (Talache) mine at Quartzburg, Gold Dredging, Inc., near Pierce, the Grimes Co. (dredge) near Idaho City, Lone Pine mine at Golden, Wharton Placers (dredge) near Centerville, Golden Anchor mine at Burgdorf, Come-Back mine at Pioneerville, Gnome mine near Elk City, American Consolidated Mining & Milling Co. (Grunter mine) near Shoup, Placer Basin mine near Council, Jordan Creek Placers (dredge) near Silver City, Little Smoky Dredging Co. near Fairfield, and the Penman Mines Corporation (Homestake mine) near Orogrande.

Siliceous gold ore, old tailings, etc., yielded about 47,885 ounces of gold in 1935, compared with 55,468.36 ounces in 1934, and represented 57 per cent of the total gold; placers yielded 38 per cent; and the remaining 5 per cent came from other classes of ore (chiefly gold and silver and lead-zinc). Of the total gold produced from lode mines (52,112 ounces) 45 per cent was recovered from treating gold ore and old tailings by amalgamation and concentration; 21 per cent was recovered from treating gold ore by straight concentration; 16 per cent was recovered by treating gold ore by amalgamation; 4.6 per cent was recovered by treating gold ore and old
tailings by cyanidation; and 4 per cent was recovered from crude gold ore shipped direct to smelters.

The Boise Basin district in Boise County is one of the chief gold-producing districts in Idaho, and the output of gold from lode mines increased from 4,197.71 ounces in 1934 to about 8,300 ounces in 1935. The gain was due chiefly to the large production of gold ore, treated by amalgamation, from the Gold Hill (Talache) mine at Quartzburg. The output of gold from placers in the Boise Basin district in 1935 was about the same as that in 1934 (4,934.42 ounces). More than 71 per cent of the placer output was recovered by two floating dredges—one working the Wharton placers on Grimes and Granite Creeks near Centerville and the other working claims also on Grimes Creek near Pioneerville. Most of the remainder of the placer production was recovered by hydraulic and sluicing operations at the Gold Hill property near Idaho City.

The Middle Boise district in Elmore County has been the largest producer of gold in Idaho since the St. Joseph Lead Co. began milling gold ore in February 1932 by amalgamation and flotation concentration. The output of gold in the district in 1935 was 3 per cent less than the output in 1934.

The output of gold from the Warren district in Idaho County increased from 15,486.61 ounces in 1934 to about 16,200 ounces in 1935. Nearly all the gold (96 per cent) was recovered by dredging operations on Warren Creek.

The Yellow Pine district in Valley County is another important gold-producing district in Idaho. The Yellow Pine Co., operating the Meadow Creek group near Stibnite, is the chief producer in the district; the company treated more than 50,000 tons of gold-antimony ore by flotation concentration in 1935. The gold output of the district decreased from 10,491.36 ounces in 1934 to about 8,380 ounces in 1935.

Other districts in Idaho that produced 1,000 to 3,500 ounces of gold each in 1935 were the Seven Devils in Adams County, Little Smoky in Camas County, Pierce in Clearwater County, Marshall Lake, Orogrande, and Ten Mile in Idaho County, Mineral Hill in Lemhi County, and Carson in Owyhee County. Nearly all the gold produced in the Seven Devils district was recovered from gold ore of smelting grade from the Placer Basin mine. The output of gold from the Little Smoky, Pierce, and Carson districts was nearly all placer gold recovered by dredging operations; and the gold produced from the other districts was recovered from gold ore treated either by amalgamation, cyanidation, or amalgamation and concentration.

Silver.—Idaho was again the largest producer of silver in the United States, followed by Montana and Utah. The output of recoverable silver in Idaho in 1935 was 10,241,778 ounces compared with 7,394,143 ounces in 1934. For the first time in recent years the silver output exceeded the average annual output of the last decade (8,285,300 ounces). The value increased from $4,780,052 in 1934 to $7,361,278 in 1935, due chiefly to the increase in the average sale price of silver from 64.6+ cents an ounce in 1934 to 71.875 cents an ounce in 1935. All the large producers of silver in Idaho increased their output in 1935 over 1934, but the increase from the Yankee Boy mine of the Sunshine Mining Co. east of Kellogg was especially noteworthy; the company increased its silver output from 3,456,568 ounces in 1934 to 5,876,908 ounces in 1935 and was again the largest silver producer in the United States. Other large producers of silver were the Hecla, Bunker Hill & Sullivan, Morning, Crescent, Page, and Gold Hunter mines, all in the Coeur d'Alene region, Shoshone County. Mines in the Coeur d'Alene region produced 9,894,308 ounces of silver in 1935 (97 per cent of the State total) compared with 7,062,640 ounces in 1934. Most of the remainder of the silver was produced from mines in the Middle Boise district, Elmore County; Boise Basin district, Boise County; Bay Horse district, Custer County; Lakeview district, Bonner County; Yellow Pine district, Valley County; and Washington district, Washington County.

Of the total silver produced in Idaho in 1935, 61 per cent was recovered from silver ore (chiefly classified as copper-lead ore in 1934); 23 per cent was recovered from lead-zinc ore; 14 per cent from lead ore and old tailings; and the remaining 2 per cent chiefly from siliceous ores. Ore and old tailings
treated in concentration plants yielded more than 96 per cent of the total silver output.

**Copper.**—The output of recoverable copper increased from 1,531,625 pounds, valued at $122,530, in 1934 to 2,096,095 pounds, valued at $173,976, in 1935. More than 59 per cent of the total copper produced in Idaho in 1935 was recovered from silver ore; 25 per cent was recovered from lead-zinc ore; and most of the remainder from lead ore and old tailings. Mines in Shoshone County produced nearly 95 per cent of the State output of copper in 1935, and more than half of it came from the Sunshine mine; it was followed by the Bunker Hill & Sullivan, Morning, Hecla, and Crescent mines.

**Lead.**—The output of recoverable lead increased from 142,648,216 pounds, valued at $5,277,984, in 1934 to 158,072,370 pounds, valued at $6,322,895 in 1935; the average annual output for the last decade was 222,358,150 pounds. In 1917, the year of record lead output, mines in Idaho produced 393,559,521 pounds of lead. The largest increase (more than 14,000,000 pounds) in the output of lead in 1935 was reported from the Morning mine of the Federal Mining & Smelting Co. Substantial increases in lead output were also reported from the Page (Federal Mining & Smelting Co.), Hecla, Star, Sidney, and Frisco mines. The largest decrease in lead (about 4,000,000 pounds) was recorded from the Golconda mine; the output of lead from the Bunker Hill & Sullivan, Gold Hunter, and Clayton Silver properties also decreased considerably. About 70 per cent of the total lead produced in Idaho in 1935 was recovered from lead-zinc ore, and nearly all the remainder was recovered from lead ore and old tailings. There was an increase of about 14,139,000 pounds of lead from lead-zinc ore and an increase of about 815,000 pounds from lead ore and old tailings. In 1935 the Morning mine of the Federal Mining & Smelting Co. was the largest lead producer in Idaho, a position held for many years by the Bunker Hill & Sullivan Mining & Concentrating Co.; the Bunker Hill & Sullivan mine ranked second in lead, and the Hecla mine was third. These three properties, each producing more than 41,500,000 pounds of lead, were followed by the Page, Gold Hunter, Frisco, Blackhawk, Star, Golconda, Sidney, Clayton Silver, and Hope mines. All the output of lead in Idaho in 1935 except about 1,445,000 pounds was produced from the Coeur d'Alene region. Most of the remainder was produced from mines in the Bay Horse district, Custer County, and the Pend d'Oreille district, Bonner County.

**Zinc.**—The output of recoverable zinc was 62,195,031 pounds, valued at $2,736,581 in 1935 compared with 49,598,651 pounds, valued at $2,132,742 in 1934. The average annual output of zinc for the last decade was 54,871,777 pounds. Nearly all the increase in the production of zinc in Idaho in 1935 was due to the increase in the output of lead-zinc ore. More than 82 per cent of the zinc produced in Idaho in 1934 was recovered from lead-zinc ore from the Morning and Bunker Hill & Sullivan mines; the output of zinc from each property increased more than 5,000,000 pounds. Substantial increases in zinc production were also recorded from the Star, Sidney, and Page mines, but there was a decided decrease in zinc from the Golconda mine. The Star and Sidney mines again became producers of lead-zinc ore in November after being inactive for several years. The Morning mine of the Federal Mining & Smelting Co. continued to be the largest producer of zinc in Idaho, followed by the Bunker Hill & Sullivan, Frisco, Page, Star, Golconda, Sidney, and Hecla mines, all in the Coeur d'Alene region. A little zinc was also recovered from ore mined in the Warm Springs and Mineral Hill districts, Blaine County, and in the Lakeview district, Bonner County.

**Ore output.**—About 1,512,300 tons of ore, old tailings, etc., were produced from mines in Idaho in 1935 compared with 1,287,182 tons in 1934. There were substantial increases in the output of lead-zinc ore, silver ore, and gold ore, and there was also an increase in the output of lead ore. More than 81 per cent of the ore came from mines in the Coeur d'Alene region, and 15 per cent was gold ore and old tailings from the Boise-Rochester, Yellow Pine, Orogrande-Frisco, Gold Hill, Grunter, Lone Pine, Homestake, and Gnome mines. More than half (805,285 tons) of the material
from mines in the Coeur d'Alene region was lead-zinc ore, and nearly all the remainder was lead ore and old tailings and silver ore.

**Gold ore.**—The output of gold ore, old tailings, etc., in Idaho in 1935 was 261,356 tons, an increase of 61,535 tons over the output in 1934. This large increase was due chiefly to the production of gold ore from the Orogrande-Frisco property in the Orogrande district, Idaho County; the increase in the output of gold ore from the Gold Hill (Talache) mine in the Boise Basin district, Boise County; and the treatment of old tailings from the Boise-Rochester property in the Middle Boise district, Elmore County. The largest producer of gold ore and old tailings in Idaho in 1935 was the St. Joseph Lead Co., operating property in the Middle Boise district, Elmore County; it was followed by the Yellow Pine property in the Yellow Pine district, Valley County, the Orogrande-Frisco group near Orogrande, and the Gold Hill (Talache) mine at Quartzburg. These four properties produced nearly 59 per cent of the total output of gold ore, old tailings, etc. Other properties that produced more than 3,000 tons of gold ore each were the Grunter in the Mineral Hill district, Lemhi County; the Lone Pine in the Ten Mile district, Idaho County; the Homestake and Gnome in the Orogrande district, Idaho County; the War Eagle in the Robbins district, Idaho County; and the Gold Hill in the Mineral Hill district, Lemhi County.

**Gold and silver ore.**—The output of gold and silver ore (379 tons) was produced chiefly from the Come-Back mine in the Boise Basin district, Boise County.

**Silver ore.**—In recent years the ore from the Sunshine and Crescent mines was classified as copper-lead ore, but in 1935 the classification was changed to silver ore, which accounts for the large increase in the State output of silver ore in 1935 over 1934. The output of ore from the Sunshine mine in 1935 increased 51,846 tons over the output in 1934, and there was also an increase in the output of ore from the Crescent mine. These two properties near Kellogg, Shoshone County, produced more than 95 percent of the State output of silver ore.

**Copper ore.**—Nearly all the copper ore (728 tons) produced in Idaho in 1935 came from the Copper Queen mine near Tendoy, Lemhi County, and from the old Empire mine near Mackay, Custer County.

**Lead ore.**—The output of lead ore and old tailings in Idaho in 1935 was 259,777 tons, an increase of 19,312 tons over the output in 1934. The gain was due almost entirely to the increase in the output of lead ore from the Hecla mine at Burke, Shoshone County. This mine and the Gold Hunter mine at Mullan, also in Shoshone County, produced 92 percent of the total output of lead ore and old tailings. The Clayton Silver (Camp Bird) mine in the Bay Horse district, Custer County, and the Hope mine in the Pend d'Oreille district, Bonner County, each produced more than 4,500 tons of lead ore. About 94 percent of the total output of lead ore and old tailings was treated in concentration plants, and the recovered lead increased from 33,198,441 pounds in 1934 to 33,946,784 pounds in 1935. Crude lead ore of smelting grade amounted to about 15,000 tons, and the recovered lead was 11,990,800 pounds compared with 12,122,080 pounds in 1934.

**Lead-zinc ore.**—The output of lead-zinc ore in Idaho in 1935 was 805,506 tons, an increase of 81,520 tons over the output in 1934. This large gain was due chiefly to the increase in the production of lead-zinc ore from the Morning, Page, and Frisco mines and to the reopening of the Star and Sidney mines. Nearly all the output of lead-zinc ore came from mines in Shoshone County, and the entire production was treated in flotation-concentration plants. The Bunker Hill property was again the largest producer of lead-zinc ore in Idaho, followed by the Morning mine of the Federal Mining & Smelting Co.; these two properties produced 81 percent of the total output of lead-zinc ore. Other large producers were the Page, Frisco, Golconda, Star, Blackhawk, and Sidney mines. The largest decrease (more than 40,000 tons) in the output of lead-zinc ore was reported by the Golconda Lead Mines.
Advance Summary of Metal Mining In Idaho During 1936

Actual mine production for 10 months, with an estimate for November and December, indicates that the value of gold, silver, copper, lead, and zinc produced from lode and placer mines in Idaho in 1936 was $26,981,000 compared with $19,522,704 in 1935, according to C. N. Gerry and Paul Luff of the Salt Lake City office of the United States Bureau of Mines, Department of the Interior. Substantial gains were recorded in the output of silver, copper, lead, and zinc, but the output of gold decreased about 3800 ounces. The output of silver increased from 10,240,953 ounces in 1935 to 14,400,000 ounces in 1936; copper, from 2,095,867 to 2,850,000 pounds; lead, from 158,040,250 to 180,400,000 pounds; and zinc, from 62,105,568 to 92,500,000 pounds. The value of the nonferrous metals produced in Idaho from 1863 to 1936 was about $1,052,535,000.

The chief factors that affected production of gold, silver, copper, lead, and zinc in Idaho in 1936 were the decided decrease in the output of gold from the Boise-Rochester Mine in the Middle Boise district, Elmore County, the exceptionally large increase in the production of silver from the Sunshine property in Shoshone County, the large increase in the output of lead-zinc ore from the Star and Bunker Hill & Sullivan properties in Shoshone County, the reopening of the Triumph Mine near Hailey, Blaine County, the increase in the production of gold from dredging operations in Boise Basin district, Boise County, and the gain in the production of gold from lode mines in Idaho County, especially from the Golden Anchor Mine in the Marshall Lake district. There were marked increases over 1935 in the 1936 average sales prices of silver (71.8 to 77 cents), copper (8.3 to 9.2 cents), lead (4 to 4.6 cents), and zinc (4.4 to 4.9 cents).

The output of gold decreased from 83,823 ounces in 1935 to about 80,000 ounces in 1936 and the value from $2,933,807 to $2,800,000, due chiefly to the closing in May of the Boise-Rochester property near Atlanta. The decrease in output of about 16,000 ounces in gold from this property was partly offset by substantial gains at the Golden Anchor, Fisher & Baumhoff dredge (Wharton placer), Jordan Creek dredge, Moore's Creek dredge, Orogrande-Frisco, Gold Hill (Talache), Gnome, and Gold Hill (Gold Hill Mines, Inc.) properties. There was a large increase in the production of gold from dredging operations at Warren, but this loss was more than offset by increased production of gold from dredging operations in the Boise Basin district. Ten bucket dredges in Idaho in 1936 produced about 25,500 ounces of gold compared with 9 bucket dredges in 1935 producing 23,617 ounces; the placer output recovered by other methods was about 6500 ounces. The production of gold from lode mines in 1936 was about 48,000 ounces compared with 52,078 ounces in 1935. More than 42 per cent of the gold produced in Idaho in 1936 came from lode mines in the Boise Basin, Yellow Pine, Marshall Lake, Orogrande, and Middle Boise districts, and 32 per cent came from dredging operations in the Warren, Boise Basin, Carson, Pierce, Elk City, and Little Smoky districts; the Boise Basin district was by far the chief producing gold district in Idaho in 1936.

The largest producers of gold in Idaho in 1936 were the Yellow Pine Co. near Stibnite, Golden Anchor Mine near Burgdorf, Talache Mines, Inc., at Quartzburg, Idaho Gold Dredging Co. at Warren, Fisher & Baumhoff (Wharton) dredge near Centerville, Fisher & Baumhoff dredge at Warren, St. Joseph lead Co. at Atlanta, Jordan Creek Placers (dredge) near Silver City, Moore's Creek Dredging Co. at Idaho City, Gnome Gold Mining Co. near Elk City, Orogrande-Frisco property near Orogrande, and the Grimes Co. (dredge) near Idaho City.

Idaho was again the largest producer of silver in the United States and its output (14,400,000 ounces) in 1936 was the largest that has ever been recorded in the State. The value of the output in 1936 was $11,088,000, an increase of $3,727,315 over 1935. All the large producers of silver in Idaho increased their output in 1936, but the increase from the Yankee Boy Mine.
of the Sunshine Mining Co. east of Kellogg was remarkable; the company increased its silver output from 5,876,908 ounces in 1935 to about 9,031,000 ounces in 1936 and was again by far the largest silver producer in the United States. The mine is equipped with a 700-ton flotation-concentration plant and more than 200,000 tons of ore were treated in 1936. Other large producers of silver were the Hecla, Bunker Hill & Sullivan, Morning, Crescent, Triumph, Page, Star, and Gold Hunter mines, all in the Coeur d'Alene region, Shoshone County, except the Triumph which is in Blaine County. Mines in the Coeur d'Alene region produced about 13,625,910 ounces of silver in 1936 (94.6 per cent of the State total) compared with 9,892,000 ounces in 1935. Most of the remainder of the silver output came from the Warm Springs district in Blaine County, the Lakeview and Pend d'Oreille districts in Bonner County, and the Bay Horse district in Custer County.

The output of recoverable copper in Idaho in 1936 was about 2,850,000 pounds valued at $262,200; the output in 1935 was 2,095,867 pounds valued at $173,957. Nearly all the copper produced in Idaho is recovered from silver (formerly classified as copper-lead), lead-zinc, and lead ores from mines in the Coeur d'Alene region, Shoshone County. More than three-fifths of the State output of copper in 1936 was recovered from silver ore from the Sunshine property; most of the remainder was recovered from lead-zinc ore from the Bunker Hill & Sullivan and Morning mines, and from lead ore from the Hecla Mine.

The output of recoverable lead increased from 154,040,250 pounds valued at $6,321,610 in 1935, to 180,400,000 pounds valued at $8,298,400 in 1936. The large gain was due chiefly to the increase in the production of lead-zinc ore from the Bunker Hill & Sullivan, Star, Page, Triumph, and Sidney mines, and to the increase in the output of lead ore from the Hecla Mine. About 73 per cent of the total lead produced in Idaho in 1936 was recovered from lead-zinc ore, and nearly all the remainder was recovered from lead ore. In 1936 the Bunker Hill and Sullivan Mining & Concentrating Co. was the largest producer of lead in Idaho; it was followed by the Morning and Hecla mines. These 3 properties, each producing more than 43,000,000 pounds of lead, produced 80 per cent of the State lead output. Other large producers of lead were the Page, Star, Triumph, Gold Hunter, Sidney, and Clayton Silver properties. Mines in the Coeur d'Alene district produced about 172,000,000 pounds of lead in 1936, or 95 per cent of the State total, compared with 156,-580,100 pounds in 1935. Nearly all the remainder of the lead output came from the Warm Springs district in Blaine County, Bay Horse district in Custer County, and Pend d'Oreille district in Bonner County.

The output of recoverable zinc in 1936 was 92,500,000 pounds valued at $4,532,500, compared with 62,105,568 pounds valued at $2,732,645 in 1935. Unusually large increases in the production of zinc were reported by the Sullivan Mining Co., Hailey Triumph Mines Co., Bunker Hill & Sullivan Mining & Concentrating Co., Federal Mining & Smelting Co., and Sidney Leasing Co. Nearly 77 per cent of the zinc produced in Idaho in 1936 was recovered from lead-zinc ore from the Morning, Bunker Hill & Sullivan, and Star mines. The Morning Mine of the Federal Mining & Smelting Co. continued to be the largest producer of zinc in Idaho, followed by the Bunker Hill & Sullivan, Star, Triumph, Sidney, Frisco, Page, North Star, and Hecla mines, all in the Coeur d'Alene region except the Triumph and North Star. The Coeur d'Alene region produced about 83,150,000 pounds of zinc in 1936, or 90 per cent of the State total, compared with 62,017,841 pounds in 1935. The remainder of the zinc output came from the Warm Springs district in Blaine County.

About 1,785,000 tons of ore were produced in 1936 compared with 1,520,-945 tons in 1935. The output of lead-zinc ore was about 970,000 tons, an increase of 149,326 tons over 1935; silver ore increased from 181,367 tons to 249,000 tons and lead ore from 256,077 tons to 300,000 tons; the output of gold ore was about the same as that in 1935 (262,202 tons). The Bunker Hill & Sullivan mine was the largest producer of ore in the State, followed by the Morning Mine, both producers of lead-zinc ore. The Hecla Mine, a producer of lead ore, ranked third, and the Sunshine property, a producer of silver ore, ranked fourth; the Orogrande-Frisco property near Orogrande was
the largest producer of gold ore. About 80 per cent (1,425,000 tons) of the total ore produced in the State in 1936 came from 26 mines in the Coeur d'Alene region, and 15 per cent was gold ore chiefly from Idaho, Valley, Boise, and Elmore counties. An increase was indicated in the number of lode mines in 1936 but the number of placer mines was about the same as in 1935. There were 1,079 placers and 289 lode mines in 1935, a total of 1,368 mines.

Adjusted State and county annual figures and further operating details by districts will appear in Minerals Yearbook 1937.

### Coeur d'Alene Mines Dividend Record for 1936

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### Dividends Paid by Mining Companies of the Coeur d'Alene Mining District

(1886 to 1937)

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GRAND TOTAL $152,351,586

The amount estimated for leasers and companies not listed is placed at a conservative figure rather than otherwise.

The list does not include records of personal and partnership profits in small operations, principally in placer mining in the Murray district.
Monthly Average Prices of Metals
1933-1934-1935-1936

**SILVER**

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Quotations—Cents per oz. troy, 999 fine.

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Quotations—cents per pound.

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Quotations—cents per pound.
## Ore Production of Shoshone County

**Julius P. Hall, E.M., Wallace, Idaho**

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(Production Record for 1934-35 on next page.) This data taken from Minerals Year Book, 1936.
SHOSHONE COUNTY

COEUR D'ALENE REGION

Mine production of gold, silver, copper, lead, and zinc in the Coeur d'Alene region, Shoshone County, Idaho, 1934-35, and total, 1884-1935, in terms of recovered metals.

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1 Figures not available.
2 Short tons.

SUNSHINE COSTS

Cost per ounce of silver produced at the Sunshine Mining Company, Kellogg, Idaho, as reported to stockholders, was as follows in 1936:

- Development ...........................................................$0.0316
- Mining ................................................................. 0.0933
- Milling ................................................................. 0.0110
- General expense .................................................... 0.0552
- Taxes ................................................................. 0.1234

Total ................................................................. $0.3145

Development costs included sinking the new four compartment shaft to below the 2300-foot level.
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