

STATE OF OREGON  
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES  
329 SW. Oak Street  
Portland, Oregon

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Bulletin No. 14-A

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# Oregon Metal Mines Handbook

By the Staff

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Bulletin No. 14-A Northeastern Oregon—East Half  
No. 14-B Northeastern Oregon—West Half  
No. 14-C Southwestern Oregon  
No. 14-D Northwestern Oregon  
No. 14-E Central and Southeastern Oregon

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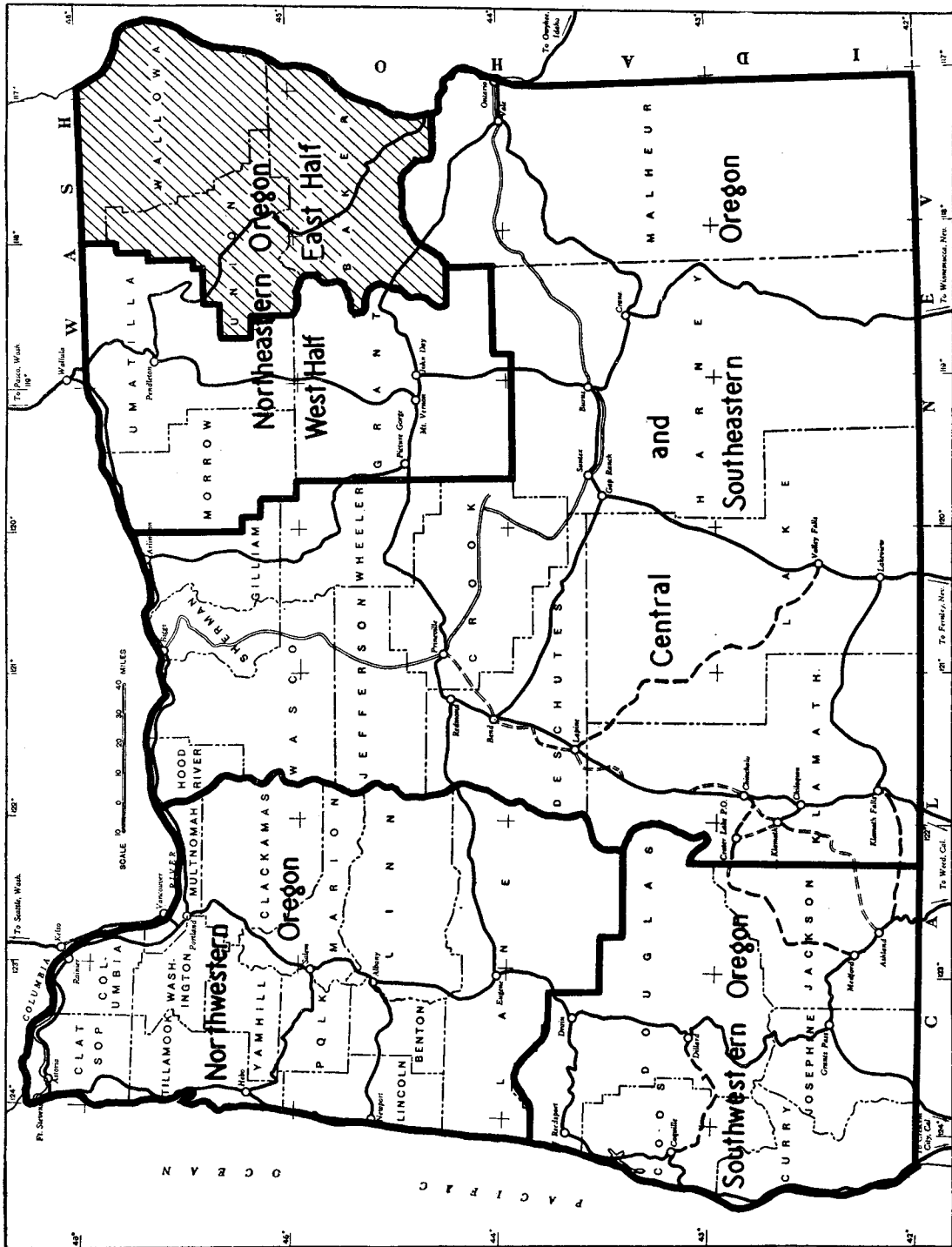
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PRICE 50 CENTS



INDEX MAP SHOWING AREAS COVERED BY VARIOUS BULLETINS.

## FOREWORD

THE ONLY handbook or catalog of Oregon mines ever published was issued in 1916—more than twenty years ago. It has been out of print for many years.

Ever-increasing demand—both from Oregon and from out-of-state—for such information on mining properties has shown the present need for such a handbook.

It is in line with the policy of the Department to release at the earliest reasonable time information that is of value to the mining industry, that it is deemed best to issue this new handbook *now* rather than wait two or three years until the information is truly complete and the job is done to our entire satisfaction.

Although Department engineers, in the past eighteen months, have reported on some 275 properties and have gathered information from various sources on many more, both errors and omissions will be found in the present bulletin.

For the sake of economy the Handbook is divided into five separate parts, each covering a different portion of the state. Thus one may obtain a bulletin giving description of all metal mines in one part of the state without having to pay for (and without the Department having to furnish and pay postage on) the entire Mines Handbook. Furthermore, this arrangement will facilitate and economize the task of bringing the data up-to-date as mines are developed and new ones found.

Much excellent material has been taken directly from the old Mines Handbook—especially in the case of mines whose workings are not accessible now. The Department is indebted to Mr. Jack Prescott, of Baker, whose notes have been freely drawn upon. Most of the work of compiling the present bulletin has fallen to A. M. Swartley of the staff and especial credit is due him.

Each of the five bulletins making up the present Metal Mines Handbook will contain: an alphabetical name and location list of all mines in the district, a general introductory statement covering the general geology of the state, an index map showing the mining divisions of the state as covered by the several bulletins, and a larger-scaled map of the area covered by the bulletin, in addition to the individual descriptions of the mines in the area in question.

At some future time, the Department will prepare a Handbook of the non-metallic properties, which, with the present Metal Mines Handbook, will complete the listing and description of all known mineral producers—past and present—in Oregon.

EARL K. NIXON, Director.

Portland, Oregon,  
May, 1939.

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## INTRODUCTION

Deposits of many useful minerals are present in Oregon. But, because of its large area—over 95,000 square miles—parts of which are not readily accessible, adequate or satisfactory knowledge of the location and extent of mineral deposits is often incomplete or lacking. It is very difficult to prospect certain areas. Rugged mountains, with a dense timber growth in some sections, and great arid stretches of country in others have handicapped both discovery and development. Nevertheless, Oregon has produced in excess of \$250,000,000 worth of mineral products since 1850.

Ores of the precious metals have been mined in the various mountainous sections of eastern Oregon since 1861, and in the southwestern counties of the state for the past eighty-seven years. Many of the streams in these sections have furnished from year to year a varying production of placer gold. Gold has been taken from the beach sands along the coast for years, and a small amount of platinum together with its associates of the rarer metals is produced annually. Although copper was a by-product of gold and silver production before that date, Oregon began its regular shipments of this metal in 1905. Quicksilver is in regular production, and there are many deposits of chromite.

Oregon has abundant resources of building and monumental stone, common and refractory clays, as well as raw materials for making high calcium lime and Portland cement. In normal times both the manufacture of clay products and Portland cement are among the important industries of the state. It has inexhaustible supplies of sand and gravel which are suitable and are being used for many purposes. Coal has been mined for years in the vicinity of Coos bay, Coos county, and lignites and sub-bituminous coals are known to exist in various other parts of the state.

### Geography:

Oregon is similar in many ways to its sister coast states. Cutting across it from north to south are two main ranges of mountains,—the Cascades and the Coast range,—both of which continue into Washington on the north and California on the south. The Cascade mountains form the “backbone” of the state, dividing it into two parts commonly referred to as central and eastern Oregon and western Oregon. The portion east of the Cascades is about twice as large as that to the

west. The Coast range of mountains parallels the coast line very closely for its entire length.

In eastern Oregon, besides the main area of the Blue mountains, which consist of several ranges and which occupy most of the northeastern counties of the state, there are a number of scattered, lesser mountain ranges rising from a more or less level, elevated plain. It is in these rugged mountains of eastern Oregon that the greatest number of active mining operations are being carried on at the present time, and where opportunities for discovery and development are as good as the state affords.

Along Oregon's northern border the picturesque Columbia river runs for 300 miles, itself a transportation highway the value of which the people of Oregon are just beginning to appreciate. Between the Cascades and the Coast range and extending from the Columbia southward for nearly 200 miles, is the celebrated Willamette valley, traversed for its entire length by the Willamette river. In places the floor of this valley is 25 miles wide and, with the contiguous foothills, comprises over three million acres of productive farm lands.

The Willamette valley is separated from the Umpqua river valley to the south by a cross range of mountains that connects the Cascades and the Coast range. A similar range lies between the Umpqua and the great Rogue river country still farther to the south. These two rivers drain westward into the Pacific, and within their broad valleys are thousands of acres of the most productive farm lands in the state. Lying against the California border is the great Siskiyou (Klamath) uplift, which again connects the Cascade and the Coast ranges, and separates Oregon territory from the Shasta region in California.

Outside of mountainous areas, much of northeastern Oregon consists of rolling uplands suitable for wheat growing and the raising of livestock. It will thus be noted that Oregon possesses a great diversity of land surface, and a corresponding variety of industries besides that of mining.

### Transportation:

Main trunk lines of railroads now reach practically all parts of the state except certain southeastern areas and a coastal strip in southwest Oregon, as will be seen by a glance at a map. The Southern Pacific railway, with its many feeders,

traverses the western portion of the state from north to south, passing through the most productive portions of western Oregon and California, and connects with both water and rail lines at Portland on the north border of the state. The Oregon Electric railway operates (freight service only) from Portland to Eugene. Coast points are reached by rail and highways through passes in the Coast range, and by means of coastwise boats between San Francisco, Portland, and Seattle. Practically throughout its 300 mile course as the north boundary of the state, the Columbia river is paralleled by two trans-continental railway lines, the Spokane, Portland & Seattle Railway, or "North Bank", on the Washington side, and the Union Pacific railroad on the Oregon side of the river, both of which enter the city of Portland. The main Portland-Ogden line of the Union Pacific cuts across and taps the most important mining, farming, and stock-raising sections of eastern and northeastern Oregon, while branch lines from both of these roads reach far south into the interior and central districts of eastern Oregon. In addition, the Great Northern Railroad traverses the state from north to south, part of the way over tracks of other roads, and enters California by way of Klamath Falls.

The Oregon State system of state highways today consists of 4,738 miles of which 3,467 are paved or oil surfaced, and only 167 are unimproved, the total of which has cost \$250,000,000 since 1919. In addition to the state system a network of county and forest roads extends into mining districts, making most properties readily or reasonably accessible.

### Geologic Features:

Examination of the different sections into which the state is divided by its geomorphic (natural physical) features shows that the Cascade range is composed almost entirely of volcanic lavas of varying character that have been violently ejected or have flowed from a large number of volcanic vents. The position of these vents or openings is represented today by the many craters and sharp peaks built on top of the lava plateau and scattered throughout the entire length of the Cascade range across the state. Mt. Hood, the highest of these, rises to an altitude of over 11,000 feet, while Mt. Jefferson, North, Middle, and South Sisters, Mt. Thielsen and Mt. McLoughlin, reach

upwards of 9,000 feet above sea level. From these old volcanic openings molten lavas flowed, and showers of dust and ash were scattered over wide areas of surrounding country. Older rocks were thus broken through by the intrusive force of the molten rock from below, and then largely covered up.

The Coast range of mountains is composed largely of shales, sandstones and conglomerates. These beds are tipped up and folded; in many localities they have been intruded by dikes and sills of basaltic lava, and may be covered or interbedded with these more recent lava flows. The Klamath mountains in southwestern Oregon are composed of sedimentary, metamorphic, and igneous rocks principally of Mesozoic age. In these mountains are the chief placer and quartz mines of Jackson, Josephine, Curry, Coos, and Douglas counties, and from which has come a large production of precious metals. Because of dense vegetation the Coast range has not been thoroughly prospected, but coal, iron ore, stone, and an abundance of useful clays have been found. In addition there are the scattered gold and platinum-bearing sands located along the beaches and on some of the coast streams.

Along the west slopes of the Cascades are a variety of rocks, including Neocene lavas, volcanic tuffs and conglomerates, shales, sandstones, etc. These overlying rocks have been intruded by masses of partly or wholly crystalline rocks in places. It is in association with the latter type that most of the ore deposits are found. The east slopes of the Cascades and the adjacent country are more generally covered with lava flows. Only here and there have streams cut sufficiently deep to expose earlier rocks.

Many of the mountain ranges of eastern Oregon are largely made up of igneous rocks of both recent volcanic and ancient deep-seated origin. Some of the prominent peaks have cappings of lava resting upon deeply eroded portions of old granitoid masses that have apparently been intruded from below. Others show extensive outcroppings of sedimentary beds, sandstones, slates and marbles that have been folded or broken, and tilted at various angles, greatly modifying their original condition. There are also other evidences of greater movement and disturbance of the rocks here than in most other sections of the state. Some entire ranges seem to have been produced by up-

lift and movement along vast breaks that often extend for many miles. Such faulting has assisted in the upbuilding of the Blue mountains proper, of the Wallowa range, Steens mountain, and others in eastern Oregon. When disturbances of the kind mentioned involve rocks of igneous types that originate at or extend to great depths

in the earth, they frequently give rise to conditions that are favorable to mineralization and the formation of ore bodies. That such conditions formerly existed in eastern Oregon mountain regions to a pronounced degree is evidenced by the occurrence of extensive and rich bodies of metallic ores.

TIME DIVISIONS OF THE GEOLOGIC PAST  
(Read from bottom up)

Major Divisions		Minor Divisions	Some Events in Eastern Oregon	Some Events in Western Oregon
Quaternary 1% Man		Recent	Lowest gold placers Volcanic ash and tuff Glaciers	Lowest gold placers and gravels Cascade volcanoes Conglomerates and gravels around Portland
		Pleistocene	Diatomite Later gold placers	Quicksilver deposits
Tertiary 3% Mammals		Pliocene	Later rimrock lavas Lake beds	Cascade lavas and granodiorite with some copper, lead and zinc
		Miocene	Beginning of building of Cascade volcanoes	Columbia river Basalt floods
		Oligocene	Columbia river Basalt floods Fossil beds of John Day river	Fossil beds of Willamette valley
		Eocene	Early lavas Old gold channels	Limestone as at Markham and Dallas Old gold channels of southern Oregon and commercial coals as of Coos Bay
Mesozoic 11% Reptiles	5%	Cretaceous	Intrusion of granites and formation of gold veins, molybdenum, and tungsten	Fossil beds of the Rogue river area Intrusion of granite and formation of gold and other metaliferous veins
	34%	Jurassic	Limestones and argillites of Wallowas and elsewhere	Chromite and serpentines
	24%	Triassic	Greenstones of Copper belt	
Paleozoic 30% Amphibians Fishes Shellfish	3%	Permian		Limestones and argillites and greenstones
	6%	Carboniferous	Elkhorn Ridge argillites	Older schists and slates
	4%	Devonian		
	3%	Silurian	Burnt River Schist (?)	Older schists (?)
	7½%	Ordovician		
	6%	Cambrian		
Almost no life	55%	Pre-Cambrian time		

Formation of the earth.

While this publication is primarily devoted to the metallic minerals of Oregon it might be of interest to many to include a table showing the major and minor divisions of geologic time, together with some events in this history in eastern Oregon and in western Oregon.

There is also a rough guess as to the age of the earth and the percentage of the total time that elapsed during each major division with some application to events in Oregon.

Formation of the Earth

The earth is thought to be anywhere from 500,000,000 to 2,600,000,000 years old. If we take an

estimate about midway between these extremes, we find that by applying the above percentages, which refer to the per cent of the total lapse of time since the formation of the earth, we are able to give some rough actual ages to the different time divisions. Remember that these are *very* rough guesses. After all, what are a few million years to us now? On this basis the gold veins were formed a hundred million years ago; the old gold channels were laid down 50 million years ago; the basalt flooded eastern Oregon 30 to 40 million years ago; the glaciers carved out the deep valleys of the Wallowa one-half to one million years ago (or even more recently).

### Mineral Production:

Workable deposits of the metal-bearing ores are associated quite generally with igneous rocks; that is, either with rocks of volcanic origin or the crystalline granitoid rocks that have pushed their way towards the surface and cooled from the molten or liquid condition. On the other hand, the common building stones, clays, and other non-metallic materials are obtained mostly from sedimentary rocks—beds that have been deposited in water and later more or less consolidated.

Actual year by year statistics of Oregon mineral production dating from the discovery of gold were not recorded for many years. Even now, a segregation of the production of some of the non-metallics is not reported by the United States Bureau of Mines. As compiled from available official sources, Oregon has produced 132 million dollars' worth of metals and 118 millions of non-metallics, giving a total mineral production of 250 million dollars. These are minimum figures. How much greater the total production actually has been cannot be stated definitely.

Statistics of production are now compiled by the United States Bureau of Mines, but complete figures from all producers are difficult to get promptly. This is especially true for non-metallics, reports of some of which are never secured.

To give an idea of recent production the following table is given:

#### MINERAL PRODUCTION—1934-1938, Inclusive

Year	Metals	Non-Metals	Total
1934 .....	\$1,476,049	\$2,735,348	\$4,211,397
1935 .....	2,262,904	3,333,580	5,596,484
1936 .....	2,590,261	4,400,000 (est. in part)	6,990,261
1937 .....	2,392,133	5,234,000	7,626,000
1938 .....	3,318,000 (estimate)	5,500,000	8,818,000

Metals are gold, quicksilver, silver, copper, lead, zinc, platinum in order of value.

The most important non-metallics are stone, sand and gravel, cement, and clay products in the order of their value. Coal, diatomite, lime, pumice, and mineral waters, etc., are included in the production figures.

The non-metallic properties of Oregon are to be described in a later publication, and are therefore not described here.

## THE METALS

### Western Oregon:

The state of Oregon contains several metal-bearing areas, widely scattered in different regions. More than half of its coast is bordered by beaches and coastal plains which in places contain beds of auriferous sands. These also may contain concentrations of magnetite, chromite and ilmenite. A second mining field,—the chief producing one of western Oregon—is situated in the southwestern part of the state and includes Jackson, Josephine, Douglas, Coos and Curry counties. It may be considered as the northern extension of the gold-copper belt of California. A third region in western Oregon is that on the western slope of the great Cascade range, including Bohemia, Blue River, Quartzville, North Santiam and Ogle creek districts, extending from the Klamath mountains on the south almost to the base of Mount Hood near the Columbia river on the north.

Although gold was reportedly found in Oregon (on the headwaters of the John Day river) as early as 1845, the earliest mining of gold in Oregon was in Jackson and Josephine counties, in 1851 and 1852. In 1852 the Jacksonville district was organized, following the discovery of placer

gold on a tributary of Jackson creek. In the fall of 1852 gold was found on Josephine creek and in the spring of 1853 a great rush followed to Althouse creek, where the bed of the stream was found to be uniformly rich. From Sailor Diggings, a famous placer region on the upper Illinois, a 15-mile ditch was paid for out of one year's production. In the two or three following years practically every part of southern Oregon was prospected for gold and many productive districts were organized. After the most accessible gravel deposits were taken up and largely exhausted, placer miners turned to benches wherever such deposits could be worked by water under considerable pressure. Hydraulic mining was done in southern Oregon as early as 1856 and has been carried on almost continuously ever since.

Soon after the discovery of gold-bearing gravels, quartz veins were located. In 1859 quartz was found at Gold Hill so rich that \$400,000 is said to have been taken out the next year. A similar rich deposit at Steamboat, found at about the same date, yielded \$350,000 in a short time. The quick exhaustion of the many rich strikes gave the region a reputation of being a "pocket" country, and this

caused prospectors to search for near-surface pockets rather than to do underground development work. It is a region where many bonanzas have been found, but developments now indicate that it also contains bodies of lower grade ores of gold and copper.

Early in the '60s an 8-stamp mill was installed near Grants Pass; and many plants of similar nature have been erected since that date, the largest of which, the Greenback mill, had 40 stamps.

### **Eastern Oregon:**

The most important mining region in eastern Oregon, as well as the entire state, is that of the Blue mountains, situated in the northeastern part of the state and extending westward for 130 miles from the Idaho line. This important region comprises many mining districts. Its total gold production to date is at least three-fourths that of the entire state.

*Placer Deposits:* The first gold mining in eastern Oregon was at Griffin gulch, a few miles southwest of Baker, in the fall of 1861. In 1862 the large placer deposits of Auburn gulch were discovered, and the following year Auburn camp had a population of 5,000. By 1864 nearly all of the mining districts of eastern Oregon were known. Supplies were brought in from The Dalles, 300 miles away; so, because of the difficulty of access and cost of transportation, gravels which did not yield \$8 per day for each man were not considered workable.

In 1863 the Auburn canal was completed; the next year the Rye valley ditch was constructed; and nine years later Sparta ditch was completed. The Eldorado ditch, with its total length of over 100 miles, to supply water to the Malheur diggings was also completed in this period. But by this time the principal hydraulic placer deposits were largely exhausted and a gradual decline in production began. Recently, the introduction of standard and dragline gold dredges has caused an increase in placer production. There were twelve dredges operating in eastern Oregon in the fall of 1938.

*Lode Deposits:* The Virtue quartz mine was discovered soon after the discovery of placer gold. Quartz mines were worked at Susanville and at Mormon Basin as early as 1865 and 1868. One of the first mills was built at Susanville in 1869.

Connor Creek and Cable Cove mines were worked, but the necessity of shipping ore on horseback for several hundred miles hindered development. Real activity in quartz mining followed the construction of a transcontinental railroad in 1885, and the development of the many camps was thereafter placed on a more permanent and productive basis.

Speculation was rife from 1899 to 1903, and much money was unwisely spent. Eastern Oregon has in large part now recovered from the injurious effects of this "boom"; and since the greater number of producing properties are in good hands, there is a steady production from them. This production is being increased by recent additions to the list.

Production previous to 1904 was for some years above the million-dollar mark, but, beginning with that year, there was a decreasing annual production to 1911, the low-water mark, when \$463,439 was produced. Since 1911 there has been a marked increase, so that in 1937, the last year for which complete figures are available, the production from the six counties, for all metals, was \$1,253,657.

East of the Cascades, in addition to the productive Blue mountain region, are several widely scattered mining districts: Pueblo mountain district in southern Harney county; the Harney district in the northern part of the same county; the High Grade district of southern Lake county 80 miles west of Pueblo mountain, near the California line; the Howard district in northeastern Crook county; and the Ashwood district in Jefferson county. Spanish Gulch is in southeastern Wheeler county. The above scattered districts have had only a small production.

### **Copper:**

In Oregon copper usually occurs associated with gold and silver. Copper-gold ores are found in the Homestead district on the Snake river occurring as chalcocite and chalcopyrite along shear zones in greenstones. Another area is the copper belt of the lower Powder river valley where chalcopyrite, chalcocite, and cuprite are found in bunches, and disseminated through the shattered and sheared greenstone.

Some copper prospects are found in the Wallowa district, where mineralization consists mainly of chalcopyrite with other sulphides in contact deposits between granodiorite and limestone.

Another important district is near Takilma and the old town of Waldo, some 40 miles southwest

of Grants Pass. Here copper occurs as chalcopyrite in greenstone. The production from this district to date has amounted to about three million pounds, in spite of the long haul to market.

Other districts where copper ores are found are the Imnaha and Quartzburg in eastern Oregon, the North and South Umpqua in Douglas county, and the Klamath mountains in Curry and Josephine counties.

The total production of copper in Oregon to December 31, 1937, as given by the United States Bureau of Mines, is 23,932,000 pounds. The mine production for 1937 is reported to be 820,000 pounds.

#### Other Metals:

*Lead:* There are no mines in Oregon at the present time which are operated primarily for the production of lead. It is a common constituent of the base ores of gold and silver, and in greater or less quantities occurs in several districts in both western and eastern Oregon, especially in Lane and Baker counties.

The production of lead in 1937 was 218,000 pounds. This production came from three counties of the state with Lane county producing the greatest amount, and Baker also having a considerable production.

*Platinum:* The mountains of southwestern Oregon and northern California have long been known as the principal source of platinum in the United States. Although the output of platinum from Oregon is small (42 ounces in 1937), the scarcity of the metal in the United States makes the occurrence important.

Basic rocks such as peridotite and serpentine derived from it are generally considered to be the source rocks of platinum; and the abundance of serpentine in southwestern Oregon may account for the occurrence of platinum, although it has not been found in place.

The production comes chiefly from beach placer mines which are worked primarily for gold. Both metals are associated with the so-called "black sands."

*Quicksilver:* Since 1887 Oregon has produced about 43,000 flasks of quicksilver with a total value of \$4,000,000. It was second in production in the United States in 1937 and 1938.

Deposits occur in the western, central and southeastern parts of the state, with an especially productive area in the Ochoco mountains. A great

deal of producing territory remains to be prospected, however, and with intelligent development several partially developed properties could be added to the fourteen producers now operating. See Department Bulletin No. 4 (172 pages) for details.

*Chromium:* Chromite is ordinarily found in serpentine rocks, and there are extensive areas of this rock in the southwestern counties, and in Wheeler, Grant and Baker counties. In all of these localities chromite was mined during the World War. The places of greatest importance are those near Canyon City, in Grant county, and in the Illinois district in Josephine county. There are over 100 properties in Oregon with a total past production of 36,500 long tons, and known reserves of 62,000 long tons, not including prospective ore. In 1918, 18,000 long tons were shipped, two-thirds from eastern Oregon and one-third from the western part of the state. See Department Bulletin No. 9 (70 pages) for details.

*Nickel:* A deposit of nickel in peridotite (saxinite), in places altered to serpentine, in which the metal is present as the green silicate, genthite, occurs on Nickel Mountain, a few miles northwest of Riddle in Douglas county. The character of the occurrence suggests the possibility of an economic deposit if a sufficient tonnage could be developed. The area was prospected by means of tunnels and shafts early in the present century, but there has never been any commercial production.

*Molybdenum:* Molybdenum has been found in a few localities in the state, the most important of which probably are in the Wallowa area, occurring as contact deposits previously referred to under copper. The metal occurs as molybdenite, associated with pyrite, magnetite, quartz, calcite, garnet, epidote, and scheelite.

*Antimony:* Antimony is found in numerous sections of the state, usually in the form of stibnite, the sulphide. Promising prospects are found in the Upper Applegate district, Jackson county, near Watkins, and on Forest creek, in the same district. These ores are said to contain good values in gold and silver. A wide vein is reported to exist in Jackson county, 12 miles west of the Pacific highway, at the Siskiyou mountain summit.

Stibnite is also found on Boulder creek four miles east of Susanville in Grant county. The most important property in the state, however, is the Koehler mine, near Baker, which see for details.

## COAL

There are several localities in Oregon which contain coal. The most important of these is the Coos Bay field, which surrounds Coos bay in Coos county. This field has had a continuous production since its discovery, producing more or less actively for the past 73 years. It has a recorded production of about two and one-half million tons, reaching a maximum in 1904, when it amounted to 111,540 tons.

The coal in this section is sub-bituminous and the typical analysis of coal mined is about as follows:

Moisture .....	11-20%
Volatile matter .....	30-40%
Fixed carbon .....	35-45%
Ash .....	8-12%
Sulphur .....	1.3-1.6%
B.T.U. ....	9,000-10,000

The production in this region has been materially reduced in the past several years because of the competition of other fuels, particularly fuel oil from California. In 1937, 9,300 tons were sold.

Another locality which gives promise is the Eden Ridge field in the southeastern part of Coos county. This field has been sufficiently prospected to demonstrate the existence of two veins of coal, one 7 feet and one 10 feet thick, having perhaps the highest grade yet found in the state. A railroad has been surveyed into the district and is already constructed to a point 10 miles from the deposits.

Other coal fields have been prospected in different parts of the state. The chief localities are the Upper Nehalem in Columbia county, the Lower Nehalem in Clatsop and Tillamook counties, the Yaquina field in Lincoln county, the Eckley and Shasta fields in Curry county, the Rogue valley field in Jackson county, and the John Day field in Wheeler, Gilliam, Morrow and Grant counties.

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PART A

Baker, Union, and Wallowa Counties

General Statement:

This volume lists mining properties in the area covered by Baker, Union, and Wallowa counties in the northeast corner of the state. These are large counties as is shown in the following table:

	Acre	Sq. Miles
Baker .....	1,975,040	3,086
Union .....	1,284,480	2,007
Wallowa .....	2,028,160	3,169
Total area ....	5,287,680	8,262

The properties are segregated into areas and districts, with Baker county containing by far the largest number of economic deposits. Gold with accompanying silver forms the principal output of the mines; and the following tabulation of recorded production of gold, silver, copper, and lead for the year 1937, taken from the U. S. Bureau of Mines 1938 MINERALS YEARBOOK, show the value of output in the three counties as well as the relative value of placer and lode mines production:

FIGURES FOR 1937

County	MINES PRODUCING		GOLD			SILVER (Lode and Placer) Value
	Lode	Placer	Lode Value	Placer Value	Total Value	
Baker .....	30	24	\$413,000	\$314,965	\$727,965	\$ 26,802
Union .....	...	2	.....	735	735	2
Wallowa .....	...	2	.....	315	315	.....

County	COPPER		LEAD		Total Value
	Pounds	Value	Pounds	Value	
Baker .....	556,000	\$ 67,276	32,000	\$ 1,888	\$823,931
Union .....	.....	.....	.....	.....	737
Wallowa .....	.....	.....	.....	.....	315

In 1937 the four most productive areas of Baker county in order of value of production were Sumpter (\$277,781), Cornucopia (\$226,190), Eagle Creek (\$187,303), and Rock Creek (\$78,094). Sumpter production was wholly from placers, including dredges; output of the Cornucopia area was mostly from the Cornucopia Gold Mines (lode);

Eagle Creek had a material copper production (520,000 pounds); and Rock Creek produced 1,957 ounces of gold, 9,244 ounces of silver, 10,000 pounds of copper, and 21,000 pounds of lead, all from lode mines. Other districts reported small gold productions. In most of the areas there were many properties active in development work but with little or no commercial production.

Important deposits of nonmetallics, chiefly limestone, building, and monumental stone, occur in Baker and Wallowa counties. In most cases development of these depends upon obtaining improved transportation facilities. At Lime, in southeastern Baker county, a large deposit of limestone is being quarried and the stone made into Portland cement. The Oregon Portland Cement Co. owns the quarry and cement plant. Measured in value of finished product, this was the most important mining operation in eastern Oregon in 1937.

For convenience, areas with their contained mining districts (see index map) are outlined below, and detailed descriptions of separate properties follow:

Areas	Districts
(1) Baker .....	Auburn, Baker, Minersville, Po-cahontas
(2) Cable Cove .....	Cable Cove
(3) Connor Creek .....	Connor Creek, Snake River
(4) Cornucopia .....	Cornucopia, Pine Creek
(5) Cracker Creek .....	Cracker Creek
(6) Eagle Creek .....	Eagle Creek, Keating, Sanger
(7) Greenhorn .....	Baker County part
(8) Homestead .....	Homestead, Lower Pine Creek
(9) Lower Burnt River ...	Weatherby, Durkee, Chicken Creek, Pleasant Valley
(10) Mormon Basin .....	Dixie Creek, Malheur, Mormon Basin, Rye Valley
(11) Rock Creek .....	Rock Creek, Elkhorn
(12) Sparta—Sheep Mountain .....	Lower Powder River, Sparta
(13) Sumpter .....	Sumpter
(14) Upper Burnt River ...	Bridgeport, Bull Run, Hereford, Unity
(15) Virtue .....	Virtue
(16) Union County .....	Camp Carson, Medical Springs, Upper Eagle Creek
(17) Wallowa County .....	Imnaha, Wallowa Range, Snake River

## BAKER AREA

(Pocahontas, Auburn, Minersville, and Baker Districts)

The Baker area, as the term is now used, includes the several areas formerly referred to as the Auburn, Pocahontas, and Minersville Districts. Its boundaries are extended south to the crest of the divide, taking in the drainage of Sutton Creek and other tributaries of Burnt River as far west as Hershal. It extends west to the crest of the Elkhorn range, except for the Rock Creek District, whose eastern boundary is the 118 degree meridian. The northern boundary is the county line. The Baker area is located upon the southern end of the Elkhorn range. The flanks of this range here are four to five miles wide and present narrow sloping ridges separated by deeply incised gulches. On the east is Baker Valley, which is 3,500 feet above sea level, while along its southwestern base are the gravels of Sumpter Valley, at an elevation of 4,000 feet. The foot of the south end of the range is flooded by basaltic lavas up to 4,700 feet and Powder river flows around the district in a semicircle.

The streams which drain this district are the several branches of Salmon Creek, extending up into Hibbard, Rouen, Dutch and Washington gulches, and flowing northeasterly into Powder River; Griffin and Elk Creeks, flowing eastward; Poker Creek and California gulch flowing south into Powder River, and draining French and Blue Canyon gulches in the old Auburn diggings.

Heavy timber covers the middle slopes of the range, while the upper ridges and peaks are often bare and rocky. South and east of Auburn the rolling foothills are composed of lava and gravel covered by sagebrush.

### Geology:

The rocks are Carboniferous and Jurassic slate, argillite and some limestone, together with interbedded schists and greenstone, some of which are old lava flows. That the main granodiorite intrusion outcropping over wide areas farther north extends underneath this district is made evident by numerous dikes of porphyry.

There are numerous other old intrusives consisting of gabbro, diorite and albite granite. Some of these were intruded in post-Carboniferous times while the main granodiorites came in during late or post-Jurassic time.

Tertiary rocks cover a considerable part of the area and consist of andesite breccias and rhyolite of Dooley Mountain, the basalt which laps around the south end of the Elkhorn range and covers the hills north and east of Baker, and the very extensive lake and river deposits interbedded with and overlying the basalts.

The veins range from stringers to wide massive quartz veins. In Auburn the veins although small have occasionally produced rich pockets, while most of the larger veins in other parts of the district have been too low grade to work. At the present time both placer and quartz production is not large. There is some placer work on Elk Creek south of Bald Mountain.

The first gold discovery in eastern Oregon was made at Griffin gulch in the fall of 1861. In 1862 the large placer mines of Auburn were discovered and the following year Auburn camp had a population of 5,000.

### BAKER & HERRIMAN PROSPECT (Gold)

Baker District

"These men have a small ranch and truck garden on Salmon Creek near the Carpenter Hill Mine in sec 8, T. 9 S., R. 39 E. W. M., and have done considerable prospecting along this creek with the hope of finding some of the veins which furnished gold for the Nelson placers. Their most extensive working is a tunnel 600 feet in length, now partially caved, in greenstone. This tunnel was run to intercept the Young America vein."

Ref. Parks and Swartley, 16:21 (quoted).  
Pardee and Hewett, 14:147.

### BUCKEYE MINE

Baker District

"This mine is situated in the northwest quarter of sec. 6, T. 7 N., R. 40 E., and originally had a considerable equipment. The mine has evidently been abandoned for several years, and the workings are not usually accessible. There are many old pits and tunnels as well as some deeper shafts. From the material thrown out of these workings it is evident that some limonite gossan areas were encountered, and from most of the workings a fine-grained, white-weathering, dense rock was obtained. This contains veinlets of quartz and was evidently regarded as part of the ore. Its exact nature is not clear, but it seems to be, at least in

part, a highly silicified tuff. Rock somewhat similar to this was found on the dump from the main shaft, and it is here green in color and unweathered. This rock is highly charged with pyrite, and the pyrite occurs both in disseminated crystals and in veinlets. The masses of gossan seen at the surface probably came from the weathering of such rock.

"At the main shaft some ore still remains on the ground. This ore consists of gray to green rock which has been highly silicified so that it is now largely quartz of fine grain. This rock has been minutely fractured and the fractures filled with quartz and metallic sulphides. These sulphides are also disseminated through the rock outside of the fractures. The sulphides are pyrite, sphalerite, and chalcopyrite. The pyrite and sphalerite are especially prominent. Some of the pieces of ore show malachite stains along the cracks."

Ref. Grant & Cady, 14:155 (quoted).  
Lindgren, 01:728.

#### CARPENTER HILL MINE (Gold)

Baker District

Located on Salmon Creek in sec. 8, T. 9 S., R. 39 E. W. M., above the old Nelson placers. A tunnel has been driven 1,200 feet in greenstone and intercepts many quartz veins, the largest of which is seldom wider than 6 inches. There is a 5-stamp mill on this property, but operations ceased some years ago. Inactive.

Ref. Parks and Swartley, 16:51 (quoted).  
Swartley, 14:162.  
Pardee and Hewett, 14:146.

#### DALE (WILLIAM) CLAIMS (Gold)

Baker District

Dale controls several claims in sec. 22, T. 9 S., R. 39 E. W. M., opened by several small adits and numerous prospect pits. Country rock is gabbro. One pit exposed a 3-inch quartz seam in which free gold can be seen.

Informant: Prescott.

Ref. Parks & Swartley, 16:85.  
Gilluly, Reed, & Parks, 33:83.  
Gilluly, 37:103.  
Pardee & Hewett, 14:150.

#### ELK CREEK PLACERS

Baker (Auburn) District

Owner: Norman Parker.

Location: Sec. 4, T. 10 S., R. 39 E. W. M.

History: Yardage not known. Old placers quite extensive.

Development: Swath about 50 feet wide cut 10 to 15 feet deep for one-fourth mile. Stripping upper 4 feet and putting 6 to 10 feet through trommel and sluices.

Geology: About 4,200 feet elevation, in gulch, width 75 to 200 feet, averages 15 feet deep. Gravel medium, in earthy matrix. Only a few large boulders, not much clay. Considerable snow in winter—about 3 months operation in spring.

Equipment: 2 caterpillar draglines, one to strip, one to feed washer. The washing plant is on skids and is pulled forward by a cable as the shovel advances. It has a 3-foot diameter trommel, 5 feet of riffles and 8 feet of corduroy and burlap in sluice, and a belt stacker.

Informant: J. E. A.

#### GOLD BUG MINE (Gold)

Baker (Auburn) District

Owner: Albert L. Geiser, Baker, Oregon.

Near old Auburn and is 9 miles southwest from Baker, the shipping point. Located about 20 years ago and consists of a group of 7 unpatented lode claims. Situated in a hilly area; the country rock is porphyry, vein strata consists of a porphyry dike said to be 600 feet in width. Past production is \$40,000. Water is ample; timber on claims, power generated on the ground by a 12 h. p. gas engine.

Informant: Prescott.

#### HUNTER (JOHN) COAL MINE

Baker District

Owners: John Hunter, 2435 4th Street, Baker, Oregon; Eric Landes, Baker, Oregon.

Location: 500 feet south of railroad and highway in the SE $\frac{1}{4}$  sec. 29, T. 10 S., R. 39 E.

Area: Prospecting permit for 2,560 acres.

History: Discovered September, 1937.

Development: Tunnel 200 feet long; 45 feet inclined, horizontal for the rest of the distance.

Equipment: Blacksmith shop, mine car and track, small hoist, a good cabin on property.

Geology: The coal seam lies between two lava flows with an overburden of several hundred feet of basalt. It dips about 25 degrees to the south, the incline following down this dip for 45 feet. There it is offset 25 feet up by a north dipping fault. The tunnel continues on in and picks up the

seam as it comes down out of the roof. A section of the coal is as follows:

Basalt.  
4 feet brown shale.  
12 feet black carboniferous shale.  
7 feet woody lignite.  
3 feet black and brown soil.  
1½ feet mixed soil and coal.  
Basalt.

Informant: J. Hunter through J. E. A.

#### KENT MINE (Gold)

Baker District

Owners: George and Chester Gardener, Baker, Oregon.

"The Kent Mine, also called the Stub Mine, in the upper part of Washington gulch, has the most development work of any in this area. It is located in sec. 20, T. 9 S., R. 39 E., and has a small, poorly designed mill, located about 1¼ miles from the mine.

"The country rock is made up of argillite, greenstone and chert. The vein has a N.-NE. strike and a nearly vertical dip, and widths up to at least 15 feet, made up of quartz and shattered mineralized argillite. While there are places in the vein that are high grade, the average for a large tonnage is low.

"The development consists of a tunnel, several hundred feet long, a short winze and some raises." Dormant.

Ref. Parks & Swartley, 16:135 (quoted).  
Gilluly, Reed, & Park, 33:83.  
Gilluly, 37:102.  
Swartley, 14:162.  
Pardee & Hewett, 14:150.

#### MARBLE CREEK MINING CO. (Gold)

Baker District

Owners: James Cavin, Baker, Mrs. F. C. Robinson, Walla Walla, Washington. Lessees, L. G. Lilly and C. Kirkpatrick, Baker.

Located 12 miles west of Baker. Consists of 9 acres patented, 2 fractions and one unpatented claim. In high mountain area; country rock is porphyry; vein strata bearing NW. and SE.; width 3 feet to 10 feet, length 2,000 feet. Water scarce; timber on claim. Developed by 400 feet of tunnels.

Informant: Prescott.

Ref. Gilluly, Reed, and Park, 33:82.  
Gilluly, 37:102.

#### NELSON PLACERS

Baker District

"The Nelson placers situated at the mouth of Salmon Creek in sec. 8, T. 9 S., R. 39 E., have a reported total production in excess of \$400,000. These placers have not been worked for years." Ref. Parks & Swartley, 16:161 (quoted).  
Swartley, 14:162.

#### SALISBURY RANCH (Placer)

Baker District

Press reports 6-10-38 state that parties sinking prospect shafts to test ground or dragline dredge found coarse gold on the ranch at the mouth of Stices gulch. One nugget said to be worth \$500.

#### SCHROEDER (MAUDE) CLAIMS (Clay)

Baker District

Owner: Mrs. Maude Schroeder, Baker, Oregon. 6 placer claims 6 miles SE. from Baker. Located 30 years ago. Country rock volcanic. Deposit of clay extends over an area of 1 mile in width and 2 miles in length. Tests on this clay show it is valuable for furnace linings and is excellent for potter's use. There is a tunnel about 150 feet long.

Informant: Prescott.

#### TOM PAINE-OLD SOLDIER GROUP (Gold)

Baker (Pocahontas) District

Old Names: Yellowstone Mining Co., Marble Creek Mining Co.

Owner: Mrs. F. C. Robinson, Walla Walla, Washington.

Operators: L. G. Lilley and C. Kirkpatrick, Baker, Oregon.

Location: McCord Gulch, sec. 7, T. 9 S., R. 34 E.

Area: 4 claims, one on Tom Paine property and 3 on Old Soldier. The latter leased from Marble Creek Mining Co.

History: First filed on by Hayes in 1887-88. 150-foot tunnel driven on Tom Paine with production of \$35,800. Then sold to Hackett in 1894-5. Resold to Yellowstone Mining Co. in 1909 who developed it until 1917. No ore mined. Present activity confined to driving a crosscut, now in 700 feet, in hopes of hitting blind lead. Old workings caved. In addition to the \$35,800 taken out of the Bonanza stope Pat Powers took out \$600 placer mining the dump.

Geology: Tom Paine and Old Soldier veins are in slate and bluish-black limestone. The Old

Soldier vein was not exposed at any point. The Tom Paine vein where exposed in one place was 18 inches wide and consisted of brecciated quartz with calcite filling and very crumbly. Assayed only a little in gold and silver. The two veins are approximately parallel (S. 2 degrees E.) about 600 feet apart. The Tom Paine dips 45 to 60 degrees west. The Old Soldier vein reported as dipping 30 degrees westerly. There is a chance for intersection but survey is required. Reported survey indicates that the winze sunk 280 feet would cut the intersection. Apparently where vein was wide values dropped and where narrow values increased.

Development: Tom Paine, 600-700-foot tunnel. 80-foot winze near portal in Bonanza stope. 60-foot shaft connecting tunnel in Old Soldier vein. Main adit level in creek bottom—in 600 feet. Next level about 60 feet above driven in 500 feet. All workings at present blocked at portals.

Informant: A. V. Q.

Ref. Lindgren, 01:651.  
Gilluly, Reed, & Park, 33:81.  
Swartley, 14:162.  
Gilluly, 37:101.  
Parks & Swartley, 16:240.

#### YELLOW BOY MINING CO. (Gold)

Baker District

"The Yellow Boy Mining Co. controls 9 claims, three of which are patented, just south of the

Nelson placer in sec. 8, T. 9 S., R. 39 E. The president of the company is N. A. Muegge, and the secretary is F. C. McCulloch, both of Baker. The property is developed by two adits—the older, upper one several hundred feet long, including a 50-foot incline, and the lower one about 450 feet long. The country rock is greenstone, belonging to the Elkhorn Ridge argillite. At the face the upper adit cuts a dike, probably one of the granophyre dikes so common in the region. A few quartz stringers show in the adits."

Ref. Gilluly, 37:102 (quoted).  
Gilluly, Reed, & Park, 33:82.

#### YOUNG AMERICA (Gold)

Baker District

Owner: Mose Fuchs, Baker, Oregon.

On Salmon Creek in sec. 8, T. 9 S., R. 39 E., and 12 miles from shipping point, Baker. Located in 1880 and patented in 1889. Located in high mountain area; country rock porphyry, which is the hanging wall, greenstone the foot wall; vein bearing NW. and SE.; width 4 feet. Water ample; timber on claims, 940 feet of tunnels are developed.

Informant: Prescott.

Ref. Parks & Swartley, 16:241.  
Swartley, 14:162.  
Pardee & Hewett, 14:147.

### CABLE COVE DISTRICT

#### Geography:

The county line between Baker and Grant counties follows the divide which separates the Powder River drainage from that of the north fork of the John Day. The Cable Cove mining district covers both sides of this divide and, therefore, is in both Grant and Baker counties. It includes about 10 square miles, mostly in the headwaters of Silver Creek. It extends about 3 miles along the trend of the ridge and a mile or two down on each side. The elevation at the camp is about 7,000 feet, while the higher points are about 700 feet above. Baldy Mountain, about 2 miles southwest from the camp, has an elevation of 8,330 feet.

Cable Cove proper is on the Baker county side at the head of Silver Creek, about 10 miles northwest from the railroad at Sumpter, and is reached by a good mountain road up Cracker and Silver Creeks. Near Cable Cove the road emerges from the thick timber in the bottom of the valley and

the head of the creek appears as a wide amphitheatre with steep slopes sparsely timbered. To the west Baldy (Ireland) Mountain rises with bare light gray glaciated outcrops. Eastward a number of sharp and high granite peaks meet the eye as a continuation of the Elkhorn range. Looking north and west from the divide, wide glaciated mountain ridges and valleys can be seen.

Although of moderate elevation, a great deal of snow falls in the various basins, of which Cable Cove is a type. Glaciation caused these basins to have their present form. Snow is apt to cover the ground for about 6 months, but the roads are well protected from winds, so that it is not difficult to maintain them practically throughout the winter.

#### Geology:

The geology of all of the veins is simple, since the country rock is nearly all intrusive granodio-

rite, and aside from aplite only a few dikes are seen. The veins are of normal fissure type, the result of an extensive system of parallel shearing planes. The vein matter consists largely of granodiorite crushed and chloritized. Close to the ore lenses in the more important veins, which are usually on the hanging wall side, the granodiorite is largely altered to sericite and kaolin. These high-grade lenses are rarely more than a foot in width and consist of a small quantity of quartz and calcite gangue, the remainder being heavy sulphides. In a few places concentrating ore of lower grade is found up to a few feet in width alongside the higher grade lenses. The ore minerals are arsenopyrite, galena, chalcopyrite, pyrite and zinc blende, with gold and silver. The slopes of the divides are dotted with dumps and prospect holes along the closely-spaced parallel veins which cut across the district in a NE.-SW. direction.

#### History:

Ore was discovered in the district in 1872, but not until 1885, when the transcontinental railroad was completed, did the district become active. Work was at its height in this camp about 1900, a period of great activity in mining everywhere in eastern Oregon. One mill was erected previous to 1900, and others have been built since, but activity has been small and irregular now for many years.

#### CALIFORNIA MINE (Gold-Silver) Cable Cove District

"This may be the property of the California Consolidated Mines Company, referred to elsewhere.

"The California Mine, in sec. 15, T. 8 S., R. 36 E. W. M., adjoining the Imperial on the west, is one of the oldest mines in eastern Oregon. It was located in 1873, and at various times up to the building of the mill in 1897 shipments of high-grade ore were made assaying from \$50 to \$500 per ton. In 1897 several carloads were shipped. The 10-stamp concentrating mill was a failure. It is said that a test run upon \$25 ore produced concentrates of less value than the crude ore. There has been quite a little development upon the property in six tunnels over a vertical distance of 800 feet, but the mine is not accessible.

"The ore, like that at the Imperial Mine, consists of heavy sulphides in quartz and calcite in narrow streaks in a 3-inch vein."

Press reports (December, 1937) state that P. R. Hanson, Sumpter, was preparing to ship high-grade to smelter.

Ref. Lorain, 38:19.  
Lindgren, 01:675.  
Hewett, 31:14.  
Swartley, 14:140.  
Parks & Swartley, 16:49 (quoted).

#### CROWN POINT MINE (Gold-Silver) Cable Cove District

Owners: One of the owners is Otto Simon, Baker, Oregon.

Eleven miles from Sumpter, on the Sumpter Valley Railroad. Located in 1930, consists of 3 lode claims, in high mountain area; country rock granite and diorite; vein bearing NE. and SW.; width 4 feet. Water ample; power available from the Eastern Oregon Light & Power Co., nearby; timber on claims. Mine now idle, and no equipment on property. Developed by 1,800 feet of tunnels.

Informant: Prescott.

#### DEAN MINE (Gold-Silver) Cable Cove District

Owner: Molly N. Harpham and Jess Baker, Baker, Oregon.

Is 12 miles from shipping point, Sumpter, on Sumpter Valley Railroad. Located several years ago and consists of 6 unpatented claims. Located in high mountain area; country rock greenstone and granite; vein bearing NE. and SW.; width 3 feet. Water ample; power can be obtained from Eastern Oregon Light and Power Co., nearby; timber on claims. Only prospect work has been done.

Informant: Prescott.

#### GALLOWAY MINE (Gold-Silver) Cable Cove District

Owner: Bert Piper, Baker, Oregon.

Nine miles from Sumpter, on Sumpter Valley Railroad. Located several years ago; in high mountain area; country rock argillite and porphyry; bearing NE. and SW.; width 20 feet. Water ample; power available from Eastern Oregon Light and Power Co., nearby. Claims are now idle, but development work has been done for the past five years.

Informant: Prescott.

**GRANITE CROUP (Gold-Silver)**

Cable Cove District

Owner: George Ingerson, Baker, Oregon.

Location: SW. corner sec. 13 or thereabouts, T. 8 S., R. 36 E. W. M. Elevation 7,000 to 8,000 feet.

Area: 12 claims across ridge into Cable Cove, located 1938.

Development: 200-foot drift on one claim. Numerous open cuts; one shaft.

Equipment: None. Property is still in prospect stage.

Miscellaneous: Has scanty spruce and hemlock timber. Snowfall is heavy during winter; accessible by same road that goes to Argonaut mine, 1 mile north.

Geology: Country rock granodiorite. This property is on one of the same system of veins that the Imperial, California, and other mines of Cable Cove are located upon. There are 2 veins about 500 feet apart on the property. They strike about N. 60 degrees E. and dip steeply to the S. The north vein has been prospected by over 20 trenches, and assays run from a few cents up to \$20 in gold. The south vein has been prospected by a 100-foot drift from which some ore apparently has been taken. There are 2 veins about 20 feet apart at this point, one up to 3 feet in width consisting of quartz, limonite seams and with altered limonitic, granite walls. One sample of a foot across the vein ran \$18.20. The vein at this point runs N. 65 degrees E. and dips 75 degrees S. In other localities the altered zone is considerably wider and gives assay values over a width of as much as 20 feet.

Recommendations: There is a possibility of economic development on this property. Assays made by the Department's Baker laboratory ran from \$2.35 to \$18.20. The Imperial Mine only ½ mile to the south and the Argonaut Mine 1 mile to the north have both produced ore.

Informant: George Ingerson through J. E. A.

**IMPERIAL EAGLE MINE (Gold-Silver)**

Cable Cove District

"This property of the Imperial Mining and Development Company comprises several claims situated in Cable Cove District at 6,500 to 7,700 feet elevation, on a glaciated slope south of the divide between Silver Creek and north fork of John Day River, in sec. 15, T. 8 S., R. 36 E. W. M.

The property includes the Eagle, Imperial, Winchester, and some other veins.

"Although the Cable Cove veins were known as early as 1872, it was not until the completion of the overland railroad in 1885 that the district was seriously exploited. During 1900, when Mr. Lindgren made his examination, development 'was in progress upon a great number of claims and about 10 carloads of ore were shipped to smelting works.'

"Soon after 1900 a mill was built, which was supplanted by a new one in 1909, and milling operations continued intermittently up to 1910 on ores from the Imperial, Winchester and Eagle veins. Crude ore was mined and shipped to Salt Lake by F. W. Schofield in 1914. Smelter records were seen showing a production of \$50,500 in gold and silver accredited to the Imperial property from 1904 to 1914. The mine was operated in 1915 by C. L. Arzeno and associates, who shipped some crude ore and concentrates, but got into financial difficulties and ceased operations before the year ended.

"The Intermediate tunnel is a crosscut 500 feet to the Imperial vein and a drift of several hundred feet along the vein. The Imperial tunnel comprises a short crosscut and a long drift on the same vein at a level 152 feet higher. About 550 feet from the mouth of the Intermediate tunnel, the vein splits into two branches that diverge at an angle of about 20 degrees. The west branch is supposed to be the Winchester and the east branch the Imperial vein.

"The Eagle, although the widest and longest vein, having been traced, it is said, for 2 or 3 miles, because of its lower grade of ore has received but little attention, since it was proven that their mill could not successfully concentrate these ores. The Eagle vein was not examined, but is said to be as much as 15 feet between the walls. The vein material, largely altered granodiorite, contains streaks of arsenopyrite up to a half foot wide in some places, and in other places as much as 3 feet of \$12 ore.

"The Imperial vein, usually from 3 to 4 feet wide, although there are places much wider, probably has the greatest alteration of the granodiorite between its walls of any vein in the district. The narrow lenses up to 24 inches wide, with stope and pitch length of usually less than 50 feet, are found usually near the hanging wall. The vein

filling is made up of the fragments of granodiorite considerably altered, while considerable widths have been completely altered to a soft white gouge. This is usually close to or surrounding the lenses of ore. This alteration extends often into the wall rock of the vein and is doubtless due to the ascending hot waters which deposited the ore and altered the brecciated vein and wall rock. The total production probably does not exceed \$75,000." Inactive in 1938.

Ref. Lindgren, 01:673.  
Swartley, 14:140.  
Parks & Swartley, 16:128 (quoted).  
Pardee & Hewett, 14:98.  
Hewett, 31:10, 13, 14.  
Lorain, 38:19.

#### LAST CHANCE MINE (Gold-Silver)

Cable Cove District

This may be same as "Granite Group", in part.

"The Last Chance Mine is located in sec. 14, T. 8 S., R. 36 E., upon a probable northeastern extension of the veins of the Imperial Mines. There are several veins in the Last Chance ground, but the one to which attention was directed in 1914 is on the Last Chance claim. The vein is developed for 400 to 500 feet by a drift upon it.

"The mineralization in this narrow vein is similar to others in this district. The maximum width of the ore is probably no more than 18 inches, and the greatest stope length of the shoots does not exceed 50 feet. The ore so far opened up, taking into consideration its width and nature, is not sufficiently high grade to pay operating expenses." Inactive in 1938.

Ref. Lindgren, 01:675.  
Swartley, 14:142.  
Pardee & Hewett, 14:102.  
Parks & Swartley, 16:139 (quoted).  
Hewett, 31:14.  
Lorain, 38:19.

#### MOLLIE GIBSON GOLD MINING & MILLING CO. (Gold and Copper)

Cable Cove District

"Local Name: Mollie Gibson."

"Office: Bourne, Oregon. T. V. Williams, New Castle, Penn., Pres.; Mrs. Jane Evans, Monmouth, Oregon, Secy.-Treas. Capital stock \$100,000; par value \$10; stock subscribed \$85,290; stock issued, \$82,960; stock paid up, \$83,280."

"This property of 2 claims is located in the central part of T. 8 S., R. 36 E., on the John Day side of the watershed which separates the drainage of the North fork of the John Day from Silver

Creek. It is reached from Sumpter by wagon road up Silver Creek a distance of about 15 miles. Development consists of an adit driven upon the vein between three and four hundred feet long, besides raises and surface openings. The ore consists of narrow lenses containing chalcopyrite and gold." The property is not active. (1938)

Ref. Parks & Swartley, 16:154 (quoted).

#### MOON ANCHOR MINES COMPANY

(Gold-Silver)

Cable Cove District

"Local Name: Moon Anchor.

"Office: 324 Henry Bldg., Portland, Oregon, Mike Zenger, 681 First St., Portland, Pres.; Anthony Mohr, 324 Henry Bldg., Portland, Sec.; Frank Degonda, 232 Front St., Portland, Treas. Capital stock, \$100,000; par value \$1; stock subscribed, issued and paid up, \$62,235.

"This company is developing a vein of the Cable Cove type, just north of the watershed which separates Silver Creek from Bull Creek, a tributary of the north fork of the John Day River. This property of 3 claims was not visited, but press reports late in August, 1916, state that the cross-cut which has been driven a few hundred feet to cut the ledge at considerable depth has finally reached the vein and drifting upon it has developed a shoot of ore 120 feet long and 1 to 2 feet wide of supposedly high-grade ore." Inactive in 1938.

Ref. Parks & Swartley, 16:154 (quoted).

#### MOUNTAIN VIEW PROSPECT (Gold-Silver)

Cable Cove District

Owners: G. J. Turnbow, George Bailey, and Jim Jefferson, all of Baker, Oregon.

Location: Adjoins California mine on the northwest; in the southwest quarter of sec. 15, T. 8 S., R. 36 E. Elevation between 6,500 and 7,200 feet.

Development: 300 feet in upper tunnel, and also several other tunnels which are now caved.

Geology: The Imperial, the California, and Red Chief claims all lie on individual veins in a series which strike about N. 45 degrees E., lying about 33 feet apart. The Mountain View is on a similar adjacent vein which dips 80 degrees to the south-east. It has been prospected for a distance of 400 or 500 feet. No sulphide has been seen at the surface. Towards the end of a 400-foot tunnel a narrow sulphide stringer assayed \$13.65 in gold and \$7.50 in silver. The quartz of the vein varies



up to 2 inches in thickness and the shattered zone in the granite country rock is as wide as 14 feet. There are numerous solid horses within this zone. The clay gouge associated with the quartz contains considerable chlorite and talc. Picked ore from a box at the mouth of the tunnel assayed \$9.45 gold and \$8.90 silver.

Informant: J. E. A.

**OREGON CHIEF (Gold-Silver)**  
Cable Cove District

M. F. Howe has a lease on the property, which has mining tools and is developed with 1,400 feet of tunnels. Is 11 miles from shipping point, Sumpter, on the Sumpter Valley Railroad. Located 25 years ago by A. M. Donley, and consists of 4 unpatented lode claims and a mill site. High mountain area; country rock granite; vein bearing SW. and NE.; width 7 feet. Water ample; power

available from the Eastern Oregon Light & Power Co.; timber on claims. Four men are employed at the mine.

Informant: Prescott.

Ref. Parks & Swartley, 16:171.

**RED CHIEF (Gold-Silver)**  
Cable Cove District

Owner: Otto Simon, Baker, Oregon.

Is 10 miles from shipping point, Sumpter, on the Sumpter Valley Railroad. Located in 1905 and consists of 6 patented lode claims; high mountain area; country rock granite; vein bearing NE. and SW.; width from 2 to 6 feet. Water ample; power can be purchased from Eastern Oregon Light & Power Co. Timber on claim. Mine is equipped with mining tools; developed by 1,800 feet of tunnels.

Informant: Prescott.

## CONNOR CREEK AREA

(Connor Creek and Snake River Districts)

The Connor Creek area includes all the Snake River drainage in Oregon between Huntington and Robinette. The length of the area along the river from north to south is 33 miles and the maximum width of the watershed is 10 miles. Naturally, with a difference in elevation between river (2,000 feet) and the divide (4,500 feet) of 2,500 feet there are many short swift flowing creeks and steep gulches leading to the Snake River between Burnt River and Powder River, the south and north limits of the area. Connor Creek is the largest of these small streams upon which the greater part of the mining in the area has been done. Its grade is steep and its canyon deep and narrow. It branches into two forks near the Connor Creek Mine, 2½ miles from the Snake river.

The canyon slopes are covered with sagebrush; timber is found along the west side of the area. The climate along the Snake River Canyon is mild in winter and hot in summer.

### Geology:

The eastern border of the intrusive granitoid rock of Lookout Mountain is about 6 miles from Snake River. The intrusion failed to rise to as great elevations as in most of the regions elsewhere, consequently erosion has not yet removed all the older rocks. The sediments and flows which make up the crust of the earth here were

crumpled and folded at the same time as those in the adjoining regions. Accompanying and following closely upon this activity came the intrusion of molten rock into it. Granodiorite-porphry and aplite dikes, which are off-shoots of the intrusion, outcrop in many places. The country rocks are limestone and schist. No true bedding of the limestone was noted, but the schistosity strikes N. 70 degrees E. and dips from 80 degrees N. to vertical. The limestone is blue in color and has a finely crystalline texture. In some places it is brecciated and recemented with calcite. Where the pressure of the mountain building forces was strong enough the limestone has been rendered schistose. The quartz schist found in this locality is also bluish and quite dense. In thin section it appears very fine-grained and consists chiefly of elongated quartz grains with fine parallel bands of sericite. Most of the ore deposits in the district are simple quartz veins, but recent development upon gold disseminated in schist is described under Schist Mine. Livingston (25) has mapped the area along the Snake River, and Moore (37:136) has mapped an area of about 30 square miles around Connor Creek.

### History:

There have been placer mines since early days upon the several small streams which flow into

the Snake River. Those on Connor Creek have been the most productive. It naturally has derived considerable coarse gold from the Connor Creek vein. The whole creek below the mine has been worked over twice and parts of it are being worked at the present time. The total production of the placer gold for this locality is about \$125,000.

**BAY HORSE MINE (Gold, Silver, Copper)**  
Connor Creek District

Owners: U. S. Metals Company, Portland, Oregon.

Just west of the Snake River about 7 miles below Huntington, the nearest town, and directly upon the Robinette branch of Oregon Short Line. It was opened up many years ago and was a shipper from 1920 to 1925 to the smelter at Tacoma. Mine developed by two tunnels 130 feet apart in elevation. Most of the work was done on and shipments made from the upper tunnel. The property has been idle for several years.

Informant: Prescott.

Ref. Lindgren, 01:753  
Gilluly, Reed, & Parks 33:52

**CONNOR CREEK MINE (Gold)**  
Connor Creek District

Owner: G. O. Jefferson, Portland, Oregon.

"The Connor Creek Mine is on the hillside west of the North Fork of Connor Creek, about 2½ miles above the Snake River. At the time of visit the mine was closed and the workings caved and almost wholly inaccessible. The following account is in large part summarized from Lindgren's report.

"The vein was discovered in 1871 by Wood and Edelmann. In 1872 a 5-stamp mill was operating on \$23 gold ore. In 1876 a 15-stamp mill was erected. The mine was worked almost continuously until about 1901, but the greatest productivity was between 1880 and 1890. In 1884 the Connor Creek Mine & Mill Co. bought the property for \$60,000. In 1900 there was a 35-stamp mill in operation with plate amalgamation and concentrators. A little ore was mined each year until 1910, when the mine closed. In 1915 the property was turned over to the Connor Creek Mines Co. on a lease, but it reverted after three years to the Connor Creek Mine & Mill Co., although a small production had been made and a 10-stamp mill erected in 1917.

"The production of the mine is not accurately known but was estimated by Lindgren in 1901 at not over \$2,000,000. A small production was made in 1915-1918, but this was probably not over \$20,000."

"The mine was developed by six tunnels over a vertical interval of 1,000 feet. The lowest, the Connor Creek, included 3,700 feet of workings. The Dry Creek level, 150 feet higher, was 1,400 feet long. Above this were the Bulger, 1,200 feet; the Lower, 610 feet; the Middle, 577 feet; and the Upper, 487 feet long. With the raises there was well over 8,000 feet of development work.

"The mine is entirely in slate and greenstone. The vein strikes N. 40 degrees W. and dips 70-75 degrees SW. The vein has been stoped from the Dry Creek level practically to the outcrop, but between the Dry Creek and Connor Creek levels it was much crushed and was mined only in part. The stopes were bounded on the west by a break or fault called the "final cut-off," which strikes N. 31 degrees E. and dips 45-60 degrees SE. Along this break a shear zone of chloritic puckered clay slate about 130 feet wide occurs. Only on the Connor Creek level was the vein found west of this zone.

"The vein is cut by several minor faults. Along its entire course it follows the footwall of a greenish, highly altered and pyritic dike rock. The slate is likewise highly pyritic along the vein. The vein ranges in width from a narrow seam to 8 feet, but the average is between 1½ and 4 feet. The filling is white coarse quartz that contains coarse gold, almost entirely native, with some argentite and pyrite. The gold was worth \$19 to \$20 an ounce, being unusually fine. The quartz was partly massive, partly ribboned. Where large masses of pyrite occurred the amount of gold decreased.

"The highest assays of the vein were obtained where it was 3 to 4 feet thick. The main pay shoot, which was irregular in outline, was 1,400 feet long on the Dry Creek level and extended to the surface. The milling ore of this mass ran between \$3 and \$10 in gold to the ton. Within the shoot smaller and richer bodies carrying coarse gold occurred. One of them pitched 60 degrees NW. in the vein and was about 60 feet in pitch length by 10 feet along the level. From this body \$120,000 was recovered, some argentite being associated with the gold. The rich ore was locally concentrated in a 1-foot thickness of quartz, along either

the footwall or the hanging wall; elsewhere it was irregularly distributed through the entire thickness of the vein. There was little evidence of enrichment."

Ref. Gilluly, Reed, & Parks, 33:50 (quoted)  
Parks & Swartley, 16:68  
Swartley, 14:216  
Lindgren, 01:756

#### GALLAGHER GROUPS (Gold) Connor Creek District

"There are few prospects located upon the north side of this mountain, the only ones worthy of mention are the 2 groups owned by Gallagher Brothers, located on upper Manning Creek in sec. 2, T. 11 S., R. 44 E. The nearest town is Durkee, which is reached by a good wagon road 12 miles long. The region is moderately hilly. Timber can be obtained from the slopes of the mountain.

"The country rock consists of schist, argillite and greenstone all tilted at high angles. Much faulting and shattering has taken place. The gold is contained in quartz lenses of various sizes. The maximum width observed at the old Gallagher property was about 20 inches. Minute impregnations of quartz in argillite also contain gold. Many porphyry dikes were observed in the locality so that it is probable that the granitic intrusion is at no great depth below the surface. It is said to have produced \$30,000 within a short time from a small tonnage of ore.

"The new Gallagher group about ½ mile north-east of the old group has a crosscut upon it in which is seen a badly altered porphyry dike and many stringers of quartz in the adjoining argillite. A width of some 15 or 20 feet which includes the altered dike and stringers is reported to contain fair values in gold." The property is being worked by James Berrie and associates of Durkee. (1938)

Ref. Parks & Swartley, 16:97  
Swartley, 14:217 (quoted)

#### LIDDY GROUP (Gold-Silver) Connor Creek District

45 "Between 1 and 2 miles south of the Snake River Mining Company's property and about 1 mile north of the Connor Creek Mine, in sec. 34, T. 11 S., R. 45 E., at an elevation of about 3,500 feet, is a group of claims owned by J. J. Liddy. The vein in places is several feet wide. It has been subjected to a great deal of movement, which has produced much sugary quartz. On account of this movement and faulting, there is much difficulty in following the

vein. The gold values were not learned, but small bunches of tetrahedrite were observed in the vein."

Ref. Gilluly, Reed, & Parks, 33:51  
Parks & Swartley, 16:140 (quoted)  
Swartley, 14:216

#### McCORKLE & SHANE (Gold) Connor Creek District

McCorkle and Shane have several claims located in this vicinity which are said to show good values and have promise of production soon. Frank McCorkle of Bridgeport, Oregon, will furnish data.  
Informant: Prescott.

#### MULLIN PROSPECT (Gold, Silver) Connor Creek District

"The deposit known as the Mullin prospect, discovered in 1914, is on the north side of the district, near Soda Creek. It is about 1½ miles from the railroad. The claim was not visited, and the following description is summarized from Swartley, (14:213)."

"The country rocks are limestone and schist of obscure bedding, but the schistosity strikes N. 70 degrees E. and dips 80 to 90 degrees. These rocks are cut by two veins. One 2-foot vein of milky quartz containing native gold and tetrahedrite strikes N. 40 to 50 degrees W. and dips 60 degrees SW. and has been traced about 300 feet; the other vein consists of barren quartz and calcite, strikes N. 55 degrees E., and dips 80 degrees NW. to 90 degrees. The auriferous vein is supposed to cut this barren vein and near the top of the ridge is itself cut and displaced by a 30-foot basalt dike.

"Development work at the time of Swartley's visit was confined to open cuts in which variable assays as high as \$60 to the ton were obtained."

Ref. Gilluly, Reed, & Parks, 33:51 (quoted)

#### SCHIST MINE (Gold) Connor Creek District

Owners: J. M. Mullins and Gus D. Darland, Grangeville, Idaho.

"The property is located in sec. 33, T. 11 S., R. 45 E., about 3 miles by wagon road from the railroad (19 miles north of Huntington). This part of the canyon is quite rugged and the hills are covered with bunchgrass and sagebrush. The property is about 1,600 feet above the river, which has an elevation of about 1,900 feet above sea level.

"The country rocks are limestone, limestone schist, quartz sericite schist, and argillite. The limestone is blue in color and has a finely crystalline texture; in some places it is brecciated and recemented with calcite. The schist is bluish in color and quite dense. In thin section it is seen to be very fine grained and to consist chiefly of elongated quartz grains with fine parallel bands of sericite. No true bedding planes were noted in the rocks, but the general strike of the schistosity is N. 72 degrees E., dip 61 degrees W. There are some small specks of hematite in the schist that have probably been derived from pyrite, which was probably an original constituent of the schist.

"There are several fine-grained porphyry or aplitic dikes that cut the above rocks parallel to the schistosity, although, of course, their cross-cutting nature is quite apparent in places. Some of the smaller dike stringers are badly altered and have the appearance of clay seams.

"On this property the schist is cut in many places by quartz veins a few inches wide, from which branch minute reticulate veins impregnating the body of the schist. Samples taken of the country rock all show the presence of gold. It is probable that this metal is contained in the minute stringers, while the unaltered schist is barren. The quartz and gold were deposited in the shattered schist from ascending solutions coming from the underlying cooling magma. In this case apparently the values have been disseminated widely through the schist. The limits of the gold-bearing schist have not been determined in 2 crosscuts driven upon the property.

"This property is developed by several hundred feet of tunnels and drifts. In general the values vary from 40 cents to \$3, with a few as high as \$7 and \$14 per ton. From a glance at the assay map (July, 1916), it appears that (excluding the

high assays) an average value of \$1.75 per ton is attained.

"A test mill of 75 tons per day capacity was built, which crushed with Chilian mills and cyanided the slimes.

"The climate, topography and transportation facilities are favorable for all-the-year-round operations."

Ref. Swartley, 14:215  
Gilluly, Reed & Parks, 33:52  
Parks & Swartley, 16:207 (quoted)  
Prescott

#### SODA CREEK MINE (Gold)

Connor Creek District

Owners: John Mullins, Gus D. Darland and W. R. Bullock.

Situated in sec. 18, T. 11 S., R. 45 E. Supposed to have approximately 20,000 tons of blocked ore, averaging \$2.87 per ton at the old price of gold, on this property.

#### SUBMARINE GOLD MINING CO. (Placer)

Connor Creek District

Owners: Idaho Corporation. George Neider, Pres.; Leo Adamson, Secy.-Treas., Boise, Idaho.

Location: Leases from state of Idaho for 18 miles of Snake River through T. 10, 11, and 12 and from state of Oregon for 12 miles.

The dredge is constructed of 22 sectional portions, with a central opening through which a 30-ton diving bell can be lowered by hoist operated with diesel 125 h.p. electric power plant. Compressed air pumped into the bell lowered to bed-rock forces the water out and workmen in the bell dig around boulders, loosen the material, and operate the suction pump which elevates the gravel to the deck where it is washed. In January, 1939, the dredge had not yet passed the experimental stage.

### CORNUCOPIA AREA

(Cornucopia and Pine Creek Districts)

#### Geography:

The Cornucopia District proper is small in area. The mines and prospects are all within 4 miles of the town of Cornucopia, situated on the upper reaches of Pine Creek, in the southern Wallowa range. From Cornucopia it is a distance of 25 miles to the railroad at the town of Robinette, on the Snake River branch of the O.-W. R. & N., and

33 miles farther to the main line at Huntington. The district has been expanded, however, to include all the drainage of Pine Creek and its tributaries west of the 117 degree meridian. East of this meridian lies the Homestead District. A good road from Robinette to the camp leaves the Snake River at about 1,900 feet elevation, follows a few miles up Powder River, then mounts on even

grades to the divide at 3,060 feet elevation between this stream and Pine Creek.

From here the road descends 400 feet into the Pine valley and the town of Halfway. Then a 2 per cent grade begins the steady 1,200-foot rise along Pine Creek to Cornucopia, 6 miles beyond. This passage is from the hot sagebrush hills along the Snake, through a fertile agricultural valley still dotted with pines, and into a region of deep canyons and precipitous slopes. Regular auto mail stages take the traveler directly to Cornucopia from Baker some 85 miles by road to the southwest.

From the divide between Powder River and Pine Creek to a point beyond the village of Carson all is covered by Columbia River basalt. Greenstones and similar rocks then appear, and the stream bed boulders show that Pine Creek has its sources in granitic areas.

### Geology:

The town of Cornucopia is situated at the eastern limit of a granitic outcrop of irregular outline approximately 250 square miles in extent. Its greatest dimension is southeast to northwest, a distance of about 30 miles. See Ross (38) for geologic map.

Surrounding this granitic area are found limestones, greenstones and schists. To the south and east these surrounding rocks are generally much lower in elevation, while to the north and west many of their higher points rival the "granite" in the steepness of their slopes and in the loftiness of their summits. Surrounding all is the Columbia River basalt, which covers so much of the area of Washington, Idaho and Oregon.

The producing veins are all situated on Granite Mountain two or three miles to the north and west of the town of Cornucopia, and at elevations of 1,000 to 3,000 feet above it.

There are many prospects on both slopes of this mountain as well as on Red Mountain, Simmons Mountain, in Norway basin and those to the east and south of town. There are also placers on Pine Creek. Granite Mountain contains several parallel veins which strike a few degrees east of north and usually dip 45 degrees westward.

The deposits are normal white quartz veins in granodiorite, schist and greenstone. The principal values are in gold which, except near the surface,

is not free milling, but can be successfully cyanided or concentrated by flotation.

### History:

Gold was discovered late in the 1870's and soon afterward production began in the intermittent way usual with new, isolated mountain mining camps until 1903. The production during this period was \$1,008,000. The district was a steady producer for several years after March, 1913, when the cyanide mill was built at the Union-Companion Mine and a similar mill built by the Baker Mines Company in October, 1914. There has been an almost steady production since then. The production to Jan. 1, 1917, was \$4,000,000, and the entire production from 1870 to Jan. 1, 1939, is estimated to be at least \$10,000,000, most of which came from the properties now owned by the Cornucopia Mines Company.

#### ANCHORAGE EXPLORATION CO.

(Drift Placer)

Cornucopia District

"The first placer mine to open was the Anchorage Exploration Co. Mine about two miles above Carson. W. H. Lilliard, Manager, hires seven or more men daily. The crews work the shaft at lower levels on bedrock."

(Baker Democrat-Herald, 6-29-38.)

#### AUROUS MINING CO. (Drift Placer)

Cornucopia District

Owners and Operators: Aurous Mining Co., Halfway, Oregon. Oregon Corporation capitalized at \$10,000. Pres. F. B. Drew; Secy. F. R. Drew.

Location: Pine Valley, six miles north of Halfway.

Area: 160 acres in fee, and 20-acre located claim.

Development: Shafts completed to bedrock.

#### CONUNDRUM GROUP (Gold Quartz)

Cornucopia District

"This group of claims is situated about 2 miles south of the George W. Smith claims in about sec. 30, T. 6 S., R. 45 E., in the argillite and greenstone on the south side of Cornucopia Mountain. The vein strikes east-west and dips about 50 degrees south. There are only a few inches of quartz in the vein, which is said to be high in gold."

Ref. Swartley, 14:117

Parks & Swartley, 16:71 (quoted)

## CORNUCOPIA GOLD MINES (Gold)

Cornucopia District

Owners and Operators: Richard E. Fuller, Pres.; A. Scott Hill, Secy.-Treas.; Leverett Davis, V. P., in charge of operations; A. V. Quine, Gen. Supt.

Location: Sections 27, 28, 29, T. 6 S., R. 45 E. W. M. Elevation 4,800 (at town) to 8,400 (top of Cornucopia lookout).

Area: About 2,000 acres. 975.44 acres of patented claims, and approximately the same of unpatented claims.

History: The property was discovered and the first work done in the late 1870's. No definite record of production is available from that time up to 1907. At that time Robert M. Betts became general manager, occupying that office under numerous changes and reorganizations of ownership until 1927, when the property closed down. During the period between 1927 and 1930 it was examined by a Canadian concern whose engineer reported that none of the faces showed ore. However, a new company was formed in 1930 and work started. Since that time the mine has produced around \$3,000,000 of which about \$700,000 has been produced in 1938. The present rate of production is from \$50,000 to \$100,000 per month, gross.

Miscellaneous: The climate is said to consist of "two seasons, July and winter." Snow lies on the ground for an average of 6 months of the year and is from 8 to 15 feet deep in winter. The timber is contracted for, some belonging to the company. Water rights are clear for all plants and for domestic purposes. The new road from the valley is kept open all year. The road up to the upper mine was remodeled in 1938. It climbs 1,000 feet in 1 mile, and ore is brought down daily from the upper workings to the mill by the big caterpillar and trailer.

Geology: The outcrop of the Union-Companion, the first vein, is at an altitude of 6,400 feet, or 1,700 feet above Coulter tunnel, the latter one and one-half miles down Fall Creek. The outcrop of this vein is traceable, according to Bernard McDonald, for 6,800 feet throughout the lengths of the Union, Companion, Red Jacket, and Robert Emmett claims. Its strike is about N. 20 degrees E. and dip 45 degrees W. into the mountain; its maximum width is 20 feet.

The chief country rock is granodiorite, but the vein is near the extremely irregular borders of the

intrusion, so that in the plane of the vein the wall rocks alternate continually between the intrusion and the intruded. The older rock in some places on the walls is greenish schist, originally probably a sandstone; in other parts of the mine the walls were found to be a part of an old intrusion or flow now altered to greenstone.

One characteristic rock specimen shows what appears to be a rather irregular contact with the granodiorite, so vague that one might almost say that the assimilation, or melting of it by the intrusion had been arrested when the work had been but partially completed. On the surface granodiorite is in evidence on the Union and Companion claims, while on the Red Jacket and Robert Emmett the older rocks chiefly prevail.

Numerous dikes of granodiorite porphyry are found varying from a few inches to a few feet in width and cutting both the older and the newer rocks. To the east aplite dikes are less conspicuous than at points farther west up on the mountain.

Another rock type is the Tertiary Columbia River basalt in the form of dikes. These dikes are shown on the surface with outcrops striking in all directions. These reddish-brown weathered outcrops contrast strongly in color with the whitish granodiorite which they intrude.

Goodspeed (39) discusses and maps the geology and origin of the deposits in detail.

Mineralization: Free gold tellurium ores found at surface. Main oxidation zone about 300 feet in depth. Some oxidation found to depth of 3,000 feet. Primary sulfide zone still showing at depth of 3,000 feet below surface on Union vein, vein being just as strong and containing equal or better average values to that found in the upper workings. Ore composed in main of pyrite, chalcopyrite, tetrahedrite, a little lead and zinc. Higher values usually where chalcopyrite is present. Gangue consists of quartz, with intermixed streaks of greenstone and talc. Two stages of quartz, the first being probably contemporaneous with the alteration of the granite and original fracturing. This contains no values. After the original quartz was deposited the vein was sheared and fractured, providing the opening for the second clear quartz to be deposited, which contains all of the ore values. The original white bull quartz had deposited with it quite coarse pyrite. In some sections this pyrite has later been fractured and broken with later mineral values being deposited in the fractures. The later quartz

has been microbrecciated, which provides a key for mine development.

**Development:** There are about 32 miles of workings, varying in elevation from 4,800 to over 8,000 feet. This includes the Lawrence tunnel, 3,700 feet; the Clark tunnel 4,900 feet, the Coulter tunnel, 6,200 feet. There are drifts on the Union vein on 19 levels; on the Last Chance vein, 19 levels; and all are connected at the present time by a raise from the Coulter tunnel driven in the summer of 1938 to the old Union workings.

**Equipment: Underground:** 18,600 feet of track; 30 2-ton cars; plus 5,000 feet of track on leasers' ground. Twenty 1½-ton cars, 1 Little Trammer electric Mule battery locomotive, Mancha Titan electric locomotives. Numerous small drift cars. About 25 stopers and 12 drifters. Leasers have about 12 machines altogether. 2 Anaconda mine hoists, 2 Ingersoll rotary hoists, 6 small tugger hoists, 1 25-h.p. electric hoist, 3 sinker pumps, 1 large upright pump, 2 small horizontal pumps, 1 Mitchell diamond drill.

**Surface:** 150-h.p. Ingersoll-Rand No. 10 compressor, driven by 150-h.p. electric motor. 1 Gardner Denver same. 1 1½-ton flat bed V8 truck, 1 1½-ton dump V8 truck.

Old Sullivan 900 cubic foot compressor, driven by 125-h.p. motor. R. D. 8 caterpillar (bulldozer), with Le Tourneau trailer, mounted on 4 tires. Capacity of buggy 16 to 20 tons. Hauls over 10 to 12 feet of snow. Complete blacksmith, electric and machine shops. 100 per cent electric power, 140 electric cap lamps. Leasers use carbide in a few places.

**Buildings:** Electric shop, 2 timber sheds, (sawing equipment), compressor room, blacksmith shop, warehouse, office building, infirmary, 2 change rooms, powder house, oil house, substation, complete electric diesel used as auxiliary unit in case of fluctuation of electric power, connected with Idaho Power, steam heating plant, stables, mill building, two bunk houses, 2 hydro-electric units for emergencies, 2 boarding houses, 6 staff houses, 1 manager's residence, 37 residences, store building. Complete fire protection, with water at 320 pounds available pressure.

**Mill flow sheet:** Crude ore bin (3 100-ton bins) to Dodge type jaw crusher (to about 1 inch) conveyor belt to vibrator screen, oversize to rolls, undersize to crushed ore bins (capacity 300 tons).

Magnetic pulley inserted just before vibrator screen to remove tramp iron, etc. Sampling equipment below vibrator, weightometer between crude ore bin and primary crusher. Crushed ore bin to No. 64½ Marcy ball mill, then to 2 cell Denver jig, overflow to sub-A unit flotation cells, concentrates to thickener from unit cell. Overflow from unit cell to double Dorr rake classifier, 12-foot. Jig concentrates to concentrate bins. Oversize in circuit to ball mill, one-half going to American type ball mill for regrind. Overflow from American mill to sub-A unit cell, concentrate from cell to thickener, overflow back to classifier. Overflow from classifier to 6 cell Denver sub-A flotation units. First two cells extract concentrates, going to thickener. Last four cells clean overflow from first two, their concentrates go back to first two cells. Overflow of last cell goes to slime as tails. Concentrates from Dorr 14-foot thickener pumped to Oliver type drum filter, remove moisture to 7 to 8 per cent, concentrates then hauled by truck to shipping point at Robinette (27 miles) where they are dumped into special-built steel-lined cars and shipped to Tacoma smelter.

**Reagents:** Reagents used in the flotation of the heavy minerals are as follows: (the relative amounts used vary greatly with the type of ore milled.)

- Soda ash.
- Barium sulphide.
- Pine oil (steam distilled).
- Tarol No. 1.
- Cresylic acid.
- Z-6 (Xanthate).
- Fuel oil (on occasion).

**Economics:** Due to the lenticular nature of the ore shoots, which are relatively narrow, it is impossible to block out in the true mining sense, any ore bodies. It is necessary to carry enough working faces in ore, to insure an adequate mill supply. The entire plan of the mine is carried out with this in mind. Sampling is difficult, much sampling of the broken ore being more dependable than regular breast sampling. However, the sulfides contained in the ore at any one point usually are indicative of the tenor of the ore.

The advisability of leasing is due to the fact that there is such a tremendous area of ground opened up, that adequate supervision would be out of the question. Hence the company has

adopted a system of leasing certain portions that seem to be more or less worked out, or areas where the veins are too narrow for company operation. The system is as follows: The company provides all necessary mining supplies and equipment. The lessee provides all the labor. From the production, if any, is first deducted the cost of transportation, milling, and supplies furnished. The remaining amount is divided equally between the company and the lessee.

For the first 6 months in 1938, lessees produced 8,788 tons of the total of 26,829 tons of ore mined. The lessee ore averaged .58 ounces per ton, and the company ore averaged .42 ounces per ton, the average mine run thus being .47 ounces per ton.

Mining costs are higher than normal, due to the large amount of development work, which at present is greater than the mining work. A breakdown for the first 7 months in 1938 is as follows:

Labor .....	\$2.09
Powder, caps, fuse .....	.23
Timbering .....	.49
General supplies .....	.37
Tramming (high due to great distance) .....	.64
Shop charges .....	.06
Assaying and engineering .....	.05
Power and compressed air .....	.15
Maintenance .....	.92
Supervision .....	.39
Transportation on surface .....	.72
Workmen's compensation insurance ..	.32
Social security .....	.15
Total .....	\$6.58

Milling costs for the first 7 months of 1938 are:

Labor .....	\$ .33
Supplies .....	.21
Tailings disposal (high) .....	.11
Maintenance and repairs (labor) .....	.03
Maintenance and repairs (supplies) ....	.08
Shop charges .....	.07
Assays .....	.04
Power .....	.06
Workmen's compensation insurance ..	.04
Social security .....	.02
Total .....	\$ .99
Labor .....	\$ .33

According to Mr. Davis: "We have a series of eleven veins, of these only two have produced materially, although eight have had enough development done on them to be classed as potential producers. Based on the production of areas so far mined, and assigning a deposit to depth predicted by many competent geologists, we have to date mined less than 20 per cent of the potential ore."

Plans for the future call for the tapping of all the main veins at the Coulter tunnel depth by its extension for another 6,000 feet. A main three-compartment raise will be driven from the Coulter level up through to the Clark level, which will provide a means of transportation in the future for all ore mined, eliminating the necessity for surface haulage. The two large compressors will be installed underground in the Coulter tunnel at the Union drift, providing adequate air facilities for all operations, and eliminating 6,300 feet of air line.

Ref. Lindgren, 01:743-745  
Swartley, 14:36-37  
Parks & Swartley, 16:74  
Lorain, 38:38

#### COLD SPRING MINING COMPANY (Gold) Cornucopia District

Oregon Corporation, capitalization \$6,000. Henry Melhorn, Pres., M. Cooper, Secy.-Treas., Halfway, Oregon. Property under bond and lease to Farwest Milling and Mining Co. (which see.)

#### ELK CREEK GOLD MINING CO. (Gold) Cornucopia District

Local name: Robert Emmett.

No information upon this property since Handbook was issued in 1916. One claim located one mile northwest of Cornucopia. Some milling was done (1899) on shoot of ore of good grade 1-2 ft. wide.

Ref. Parks & Swartley, 16:90, 194  
Lindgren, 01:744

#### FARWEST MILLING AND MINING CO. (Placer) Cornucopia District

This company under M. Malanphy, Pres., has a bond and lease upon the Cold Springs Mining Co. placer and the Pebble Mining Co. placer on Pine Creek. A long range dragline was set up on the Pebble using a 4-ton bucket to handle the large boulders. This was put into operation in 1937 but had trouble in handling the heavy material. In 1938 work was continued but press re-



ports do not state with what results. These combined properties are above the Pine Creek Mining Company's operations.

**FOREST QUEEN MINE (Gold)**  
Cornucopia District

According to press reports this property is owned by Ernest R. Gray of Missoula, Montana. It is said to be an extension of Cornucopia Mine vein. A small force of miners have been developing the last three years, a compressor and other mining machinery is being installed, and 10 tons of ore taken out of development netted \$85 per ton from smelter returns in September, 1938, with about 100 tons of lower grade on the dump. Owner expects to build a small mill in 1939. The property was not visited.

**JACKLEY CLAIMS (Gold)**  
Cornucopia District

"The 'Jackley' vein is about one-quarter mile west of the Wild Irishman vein, at a little lower elevation. It is about one and three-fourths miles west of the Union-Companion mill. It is a vein of fair width and considerable work is being done upon it by the owner. Fair values are encountered in the drift at times, although the main objective has not yet been reached. The surface beyond shows some displacement of the vein by basalt dikes, which may prove troublesome. Fragments of greenstone in dimensions from a few inches to a few feet are found here in the granodiorite. The granodiorite is more basic, probably due to its melting and assimilation of greenstone. Some of the unmelted fragments actually show recrystallization decreasing toward their interiors. This place is probably near the roof of the intrusion, only a downward projection of the greenstone roof remaining, the rest having been eroded away.

"Drifting upon this vein has been continued in 1915 and 1916, with an improvement in the size of the vein and contained values."

Ref. Parks & Swartley, 16:133 (quoted)  
Swartley, 14:57

**JIM FISK MINE (Gold)**  
Cornucopia District

"The Jim Fisk vein is located but a few hundred feet west of the Mayflower vein and about  $\frac{3}{4}$  mile west from the Union-Companion mill. Where observed there was a very large mass of quartz 20 to 30 feet wide. To both the north and the south this soon narrows down to ordinary widths.

No shoot of ore has been encountered. The country rock is granodiorite.

"Development was continued in a small way in 1915 and 1916, but the results have not been announced."

Ref. Parks & Swartley, 16:135 (quoted)  
Swartley, 14:55

**LAST CHANCE (See Cornucopia)**

**LOST HORSE GROUP—RED WARRIOR  
MINING CO. (Gold)**  
Cornucopia District

Willard R. Davis, L. H. Fitch and Leemon Thomas have purchased the Lost Horse group of claims, located at the head of Lost Horse canyon. These claims were formerly owned by the Lawrence Painter estate. They have organized the Red Warrior Mining Company, with Willard Davis as Manager; L. H. Fitch, Assistant Manager; L. H. Thomas, Treasurer; and Mrs. Eunice Fitch, Assistant Treasurer. (Record Courier, 1/6/38.)

**MAYFLOWER MINE (Gold)**  
Cornucopia District

Owned and operated by Cornucopia Gold Mines, Inc.

"The mill and cyanide plant is located about  $\frac{1}{4}$  mile south from the Union-Companion mill (see Cornucopia Mines Company), and receives its ores from the mine by an aerial tram from a considerably higher elevation.

"This mine is probably on an extension of the Last Chance vein, but on the south side of the mountain. The vein has the same strike and about the same dip. Its mineralization is similar to the other veins in the region, though the amount of sulphide is somewhat less.

"The vein here is smaller than at the Last Chance mine, being at the widest place not over 3 or 4 feet and in many places pinching out entirely. There is evidence in the walls that they have been subjected to a great deal of pressure, but there are no signs here of any great movement. This mine is developed with 2 adit levels and 1 intermediate. A raise in the vein 530 feet to the surface connects the several workings.

"The property operated its stamp mill and cyanide plant with steam power. They exhausted their developed ores during the summer months of 1914 and closed down.

"This property is in NW. ¼ Sec. 26, T. 6 S., R. 45 E. The mill was dismantled in 1924. Considerable development has been done by extending the 300-foot level to the Last Chance vein into Mayflower ground. Drifts and raises penetrated some ore and much valueless vein material." No new information since 1924.

Ref. Parks & Swartley, 16:151 (quoted)  
Swartley, 14:55

#### NORWAY MINE (Gold)

Cornucopia District

"The Norway mine is on the creek of the same name in sec. 9, T. 6 S., R. 45 E. The property is now owned by Mrs. Fred Stein and L. J. Usher. It is developed by a tunnel over 1,000 feet long with some short crosscuts off it. There was formerly a small mill on the property and some production was probably obtained in the early days.

"The tunnel follows the lode which is a shear zone in greenstone containing quartz lenses. There are numerous turns but the average trend is nearly north and the dip is steep to the east. The quartz lenses vary in width from a few inches to a few feet. Where observed it contains a little pyrite and films of chloritic material. Gold ore of fair grade is reported to have been found in several places along the vein. According to Swartley three ore shoots are present."

Ref. Ross, 38:215 (quoted)  
Parks & Swartley, 16:213  
Swartley, 14:61

#### PINE CREEK MINING CO. (Placer)

Cornucopia District

Owners: Oregon Corporation, B. H. Moore, Pres., 700 Yeon Bldg., Portland, Oregon; J. D. Kidwell, Secy., Baker, Oregon. Capitalization, \$25,000. Milton Steinmitz, Manager.

This is probably the old Undrewood placer operated by the Boulder Creek Mining Co. where Boulder Creek enters Pine Creek two miles below Cornucopia and below the Farwest Mining Company's placer operations.

Equipped with 4-inch and 3-inch nozzles, the latter for stacking tailings. Water is under a head of 240 feet. A 90-foot derrick operated by electricity is used to stack the many boulders. Employs 6 to 15 men. (Press reports, 1938.)

Ref. Parks & Swartley, 16:225

#### QUEEN OF THE WEST MINES CO. (Gold)

Cornucopia District

Owners: Cornucopia Gold Mines, Inc.

"Located to the westward on the opposite side of Bonanza basin from the Last Chance in the al-

most inaccessible cliffs of the mountain is the Queen of the West vein. Picturesque indeed is the position of its mine buildings; its boarding house is on a narrow cliff where material thrown from its windows falls downward for hundreds of feet. A steady nerve and a sure foot are needed on the trail from the mill to the mine and to explore the cliffs above. With snow on the ground it is impossible, and unless they brave the snowslides of the Bonanza basin trail, miners must remain at the mine for some four or five months in winter.

"Nearly all of the country rock is granodiorite, similar to that at the Union-Companion mine. There are a few fragments of schist in the vicinity of the vein which are remnants of the old roof.

"The vein has the usual strike of N. 20 degrees E. and a dip near the surface of about 45 degrees but at depth this decreases to about 30 degrees. The average width of the vein near the surface is between three and four feet, but generally speaking it decreases in width with the decrease in dip.

"The gangue minerals are quartz and calcite containing pyrite, chalcopryrite, galena, and sphalerite in bunches. It is said that the zinc, lead, and copper minerals carry most of the gold values. In many places the vein shows included fragments of altered granodiorite and the granodiorite on each side of the vein for about 2 feet is badly altered and impregnated with pyrite which is said to contain some values in gold and silver. This vein can be traced for a long distance, reported to be as much as 3,000 feet.

"Future development plans are to crosscut from the lower tunnel a few hundred feet beyond the Queen of the West vein, to cut the Red Cross vein whose principal outcrop is some 1,500 feet above the lower tunnel. The Red Cross vein is similar to the other veins, but little is known with reference to ore shoots therein."

There has been some work done on this property since 1916 with some ore discovered. The Red Cross vein is the northern extension of the Valley Vein on Cornucopia Mines ground. Press reports of July, 1938, state that the mill had been crushed by snow and the machinery was being renewed.

Ref. Parks & Swartley, 16:186 (quoted)  
Swartley, 14:54  
Lindgren, 01:745

#### RED BOY AND MT. CHIEF (Gold)

Cornucopia District

Press reports, June, 1938, state that Almon Motley and associates plan to commence opera-

tions on two lode mines located in the canyon above the Queen of the West mill site. In 1937 only development was done but the owners claim it is planned to ship ore this year. Application was made in July for 4 second feet of water from Pine Creek.

#### RED JACKET

(See Cornucopia Mines Co.)

#### RED MOUNTAIN PROSPECT (Gold) Cornucopia District

"This prospect is located about ½ mile northwest from the Queen of the West mill in sec. 21, T. 6 S., R. 45 E.

"The eastern end of Red Mountain can be seen on the way to Norway basin and to the Queen of the West mill. The rest of it is well observed from the apex of the ridge on the George W. Smith claims where, looking north, one can see Twin Lakes far below the contact of the lighter colored granodiorite, with the darker schist of Red Mountain above. Nearly all of this eminence (9,500 feet) is bare of vegetation. The rock, of reddish brown color, is almost as solid at the surface as below. Loosened by the action of ice and snow, loose rock is not permitted long to remain upon its forbidding walls.

"Although not examined much except at the contact with the 'granite,' Red Mountain appears to have been once a sediment, but due to the regional disturbances occurring before that which permitted the granitic intrusion, it is now a schist. The granodiorite is clearly seen to have intruded into the schists, because along its border are found innumerable inclusions of angular fragments of schist within it. Both porphyry and aplite dikes cut the granite and the schist.

"The Red Mountain vein is situated close to the contact with granodiorite and roughly parallel to it. The outcrop of the principal shoot has an elevation of about 7,200 feet, but the vein can be seen for a considerable distance to much higher elevations. It is not a contact vein, although locally so considered. The contact of the 'granite' with the schist does not appear to be mineralized, although there are effects which appear in the character of the granodiorite. The roughly parallel attitude of the larger biotite mica crystals gives an appearance of gnessic texture. Many of the large quartz grains are cracked and wavy, evidencing contact stresses.

"The vein has a strike of N. 80 degrees E., a dip of 50 degrees and a maximum width of five feet, but pinches to small dimensions within a few hundred feet. It is seen to cut granite, schist and the granite-porphyry and aplite dikes as well, showing that the vein is later than all of these. It is of the simple quartz type, showing banding in places together with white sericite mica. Iron pyrite, also the green stains of copper are seen in the vein material found near the collar of the shaft. This incline sunk on the vein for about 100 feet is now partially caved.

A crosscut 600 feet below the outcrop was in about 1,100 feet in 1924 and had not opened up the vein. No information since that date.

Ref. Parks & Swartley, 16:191 (quoted)  
Swartley, 14:62

#### SIMMONS PROSPECT (Gold) Cornucopia District

Owners: A. J. Simmons, W. L. Meyers and associates.

"Simmons Mountain is a long ridge between the east and west forks of Pine Creek. It is on the northern or right-hand side of the west fork, while 'Granite' or 'Cornucopia' Mountain, as it is locally known, is on the south or left-hand side. This mountain, although of lesser elevation than the 'granites' to the south, has extremely precipitous slopes, particularly the southwest portion. Readings taken with a clinometer near the principal outcrop of the Simmons vein to the stream 2,000 feet below gave a slope in excess of 40 degrees.

"This mountain is made up chiefly of a series of flows in which dense volcanics are interbedded with amygdaloids. Because of their alteration and their present color these rocks can well be called greenstones, although meta-basalt might be considered a more scientific name. The apparent strike of this series of flows is north and south and the dip is 40 degrees to the east, judging by the parallel elongation of the amygdules or calcite-filled cavities seen in the lower tunnel.

"The principal vein of the Simmons group has a strike 25 degrees to 30 degrees northwest. It has a flat dip to the east rarely exceeding 30 degrees and more often much less. The principal vein has been traced on the west and north sides of the mountain for more than 2,000 feet. It is, however, where exposed, for the most part too small to make ore unless of high grade. A great deal of work has been done on the croppings so that its width

at almost all points can be easily seen and measured. The exposed part of the vein of workable size, unless some of the narrow portions should have very rich ore of which we have no information, is about 350 feet long, the maximum width a little more than four feet, the minimum 18 inches; the average width would not exceed three feet for this distance, perhaps a little less. The vein consists chiefly of quartz with small amounts of feldspar. Probably less than 1 per cent of the sulphide minerals, chalcopyrite and galena, are present in thin streaks near the center of the vein.

"The development consists of the surface work before mentioned, short inclines sunk on the vein, and two short crosscuts to the vein, besides the principal crosscut. Outside of the principal crosscut and the surface work, the development gives little information as to the nature of the main shoot below the surface. The inclines for some strange reason were sunk at the end of shoots rather than in them where the best of the lens was exposed. The main crosscut also started towards and did cut the vein at a point outside of the principal shoot. In drifting to reach the shoot, although evidently mistaking a branch shattering of the footwall for the vein, it was luckily encountered near the edge of the shoot. Drifting, at the time the property was visited in 1914, had progressed less than 100 feet upon the quartz lens. This development is nearly all the underground development of value. The width of the lens over this distance underground seems to be about the same as that directly above it on the surface.

"This group is one of the oldest in the district and has been examined by several engineers with a view to purchase. Although not in possession of any of their reports or assay results, I am confident that the principal shoot contains considerable ore of milling grade.

"In 1915 the property was under lease and bond to the Baker Mines Co. Drifting was continued on the vein. It was reported locally that the shoot of ore in the drift was found to equal the outcrop in size and value. However, the company decided to give up the lease and it is now reported that the owners have made a working arrangement with George W. Smith who has been driving a crosscut to reach the ore upon the opposite side of the apex of the mountain from where the shoot of ore, discussed in previous paragraphs, is located. Some difficulty in holding the ground has delayed the

work of crosscutting so that the objective point has not been reached."

In 1924 property under lease to C. V. Lincoln. No late information.

Ref. Parks & Swartley, 16:203 (quoted)  
Swartley, 14:59  
Lindgren, 01:745

SMITH (GEORGE W.) CLAIMS (Gold)  
Cornucopia District

"These claims are situated about one mile north of the Jackley claims near the northern end of Granite Mountain and at the head of Little Eagle Creek in sec. 19, T. 6 S., R. 45 E. The elevation of the shallow workings is from 9,000 to 9,500 feet. The latter elevation is that of the mountain ridge.

"The country rock is granodiorite with the exception of the basalt dikes. In contrast to the north side of the mountain this side has a long and rather even slope and is deeply weathered. Float is rarely seen and vein croppings are buried under the sand and rock fragments. Veins are traced here only by the discoloration of the surface due to iron stains.

"On the lower slopes development by open cuts and short tunnels has not exposed large veins in place, but on the apex of the ridge a pit has exposed a somewhat brecciated quartz vein with altered walls striking N. 80 degrees E. and dipping 60 degrees N.

"It will be noted that this vein has a different course than the other veins on the mountain. It has fairly parallel walls and in the pit shows a width 9½ feet with reported fair values in gold. This shallow pit is sunk along the side of a thick basalt dike that cuts the vein. Many dikes are seen on this part of the mountain and doubtless will frequently interrupt development.

"The mountain has no prominent ridges upon which mine buildings could be erected and protected from snowslides. Prospecting cannot be prosecuted here for more than three and one-half months of the year. Snows on the flat come early and stay late and attain a maximum depth of at least 15 feet. Development if done in this short season can practically all be done on the vein but when the time comes to prepare for production and the erection of upper terminals of an aerial tramway, a working tunnel will have to be driven from some protected point to the vein to avoid the possible destruction of the mine structures by avalanches.

"Assessment work was done in 1915, and in 1916 F. X. Gauthier secured a one-half interest under working conditions and was doing his development work upon ore with reported good results."

No new information.

Ref. Parks & Swartley, 16:207 (quoted)  
Swartley, 14:57

UNION-COMPANION (See Cornucopia)

VALLEY VIEW (See Cornucopia)

WHITE ELEPHANT PROSPECT (Gold)

Cornucopia District

"The White Elephant, west of the Jim Fisk and about 1 mile west of Union-Companion mill, is a well-defined quartz vein 4 to 5 feet wide in granodiorite, having a strike N. 20 degrees E. and dip 45 degrees W. It is said that this vein contains fair values in gold.

"Development was continued in a small way in 1915 and 1916, but the results have not been announced."

No new information. Ownership at present unknown.

Ref. Parks & Swartley, 16:235 (quoted)  
Swartley, 14:57

WILD IRISHMAN PROSPECT (Gold)

Cornucopia District

"The Wild Irishman vein, now called the Valley View, is located about ½ mile west of the White Elephant and about 1½ miles west of the Union-Companion mill. It cuts across the southeastern end of Granite Mountain at an elevation of about 9,000 feet. The vein has a maximum width of 6 to 8 feet and can be seen from the apex of the mountain to continue clear across Bonanza basin and up the other side. It is probably a continuation of the Red Cross vein. Some of the quartz in the vein shows well-formed crystals. The strike is N. 20 degrees, E. and the dip 50 degrees to 60 degrees W.

"Work upon this vein was prosecuted in the summer seasons of 1915 and 1916 and it is reported that shoots of ore of fair size and good quality have been encountered."

No new information. Ownership at present unknown.

Ref. Lindgren, 01:745  
Swartley, 14:57  
Parks & Swartley, 16:237 (quoted)

## CRACKER CREEK DISTRICT

### Geography:

The Cracker Creek area includes all the drainage of Cracker and McCully creeks, north of an east-west line running three miles north of Sumpter, with the exception of the Cable Cove district in the headwaters of Silver creek. Granite district joins it on the west, the Cable Cove, and Rock creek (Elkhorn) districts on the north and east, and the Sumpter area on the south.

Bourne, 6 miles directly north of Sumpter, with which the district is connected by fair auto road, is the only town in the district. Branch roads extend to the various mines on Cracker, Fruit and Silver creeks. The Ibex and Bald Mountain mines, the vicinity of which has sometimes been called the Ibex district, are reached by mountain road directly up McCully fork from Sumpter, a maximum distance of 9 miles.

The lowest elevation in the district is about 5,000 feet and all of the mining plants are located above that altitude. Timber is plentiful except in the higher altitudes. The maximum important elevations are from 5,000 to 8,000 feet. Deep snow

prevails in winter but operations are nevertheless maintained throughout the year.

### Geology:

The district northeast to southwest is about 10 miles long, and most of it is in some variety of argillite, although occasional bodies of greenstone are present. The argillite and the greenstone are the oldest rocks in the district. Practically all of the important veins outcrop in argillite, but they are not far from the irregular southern border of granodiorite which extends for miles to the northward. This is the westward extension of the contact mentioned in the description of the Rock creek district, and also in the description of the Granite district to the west. The reader is referred to the description of the Ibex, Mammoth, Golconda, North Pole-Columbia Lode, Mountain View and Buckeye mines for more detailed information concerning the vein system of the district.

### History:

Placer deposits were discovered in the Sumpter area in 1862 but there has been but little produc-

tion of placer gold in the Cracker Creek area as here defined. The production has nearly all come from the quartz mines with an estimated total production of at least \$9,000,000, most of which came from the North Pole-Columbia Lode.

The North Pole claim was located in 1887 and was sold to A. Baring of London, England, in 1888. Though operated since 1887, the most active period began in 1895. The total production to date is about \$2,000,000. The Eureka and Excelsior were bought as a prospect in 1888 and operated intermittently with a production of \$800,000 to 1900, and a total production to date of \$1,750,000. The Columbia mine became active in 1895, producing about \$300,000 to 1900 with a total production to date of \$4,000,000. The Golconda mine was located in 1887 and became active in 1897 and during its active period produced about \$600,000. The Mammoth and Belle of Baker (part of the present Ibex mine) was located in 1881 and during the active period produced about \$450,000. The production from placer mining and various small quartz mining operations is estimated at \$200,000, with a total mineral production for the area of \$9,000,000.

The Golconda, E and E and Tabor Fraction ceased operations in 1905, the North Pole in 1908, and the Columbia Mine in 1916. Following the consolidation, during 1938, of the Columbia, Taber Fraction, E and E and the North Pole mines into one company, the Cracker Creek Gold Mining Co., and its leasing to the Campbell-Oregon Gold Mining Co., work was resumed on the North Pole-Columbia Lode and is being continued as this is written.

#### ANALULU MINE (Gold-Silver)

Cracker Creek District

Reported owned by Bert Piper, Baker, Oregon.

Located about nine miles from Sumpter on a branch of Silver creek in sec. 6, T. 9 S., R. 37 E., at elevation of 5,320 feet; on the SW. extension of the North Pole-Columbia Lode; about 300 feet of tunnels and 300 feet of shafts. Mine is being prospected by the owner. Vein said to be 10 feet wide. Area, 4 claims and millsite.

Ref. Lindgren 01:667  
Park & Swartley 16:15  
Hewett 31:17

#### ARGONAUT MINE (Gold, Silver)

Cracker Creek District

The Argonaut mine is 4.5 miles by road north of the old Columbia mill, at about 7,000 feet ele-

vation. In 1936 it was being developed by Bascom Parker and associates; who sold it in January, 1939, to H. C. Wilmot. See Baker Herald, January 19, 1939.

A drift was being driven along a northeasterly striking fissure toward its intersection with an easterly striking fissure, at which point there were good surface showings. The fissures are in argillite a short distance south of the southern edge of the Bald Mountain batholith. About 12 feet of intensely sheared mineralized argillite and gouge was exposed in the face of the drift.

Press reports of 1937-1938 state that some high grade ore was shipped and that the Balm Creek mill had been purchased and was being hauled to the property.

Ref. Lorain 38:20,-23

#### BELLE OF BAKER MINE (Gold, Silver)

Cracker Creek District

Local name: Mammoth Mine.

Present owners unknown. "The old Mammoth mines are on the divide between McCully's fork and Silver creek in secs. 35 and 36, T. 8 S., R. 36 E. The latter has been abandoned since about 1902 and the workings are not accessible. On the former there is a 400-foot shaft with drifts at four levels, aggregating about 2,000 feet. Since 1909 work has been confined to the two upper levels, the lower levels being filled with water.

"Though a gap of several hundred feet exists between the workings of the Mammoth and Belle of Baker mines, the two appear to explore the same vein. The vein outcrops in granodiorite but argillite locally forms the hanging-wall in the Belle of Baker workings. The outcrop of the explored parts of the vein lies within an area of glaciation and the zone of oxidation is less than 100 feet deep.

"In the Belle of Baker mine, the vein has been explored for a maximum distance of 700 feet on the 100-foot level, and trends N. 45 degrees E. with a dip of 68 degrees southeast. On this level a shoot 400 feet long has been stoped to the surface, though on the 200-foot level the length is about 120 feet. The vein attains a maximum width of 35 feet on the west end. A hanging-wall fork from the vein known as the 'Shoestring' has locally been the source of some rich ore. The main vein consists of alternating zones of gouge, sheared argillite and lenses of silicified argillite breccia, that are highly irregular and non-persistent. The

gouge seams are dominantly sericitized masses of crushed granodiorite and contain pyrite, but little gold. In contrast with most of the other argillite breccias of the region, the zone of comb quartz crystals is thin and the cement is dolomite. An extremely interesting feature of the vein is the narrow zones of rich gold-bearing quartz with which roscoelite is associated. These are highly silicified argillite breccia, and the gold is generally uniformly disseminated as ragged wires in the quartz though as noted by Lindgren it also occurs adjacent to small blotches of roscoelite, and on secondary fractures. Textural evidence shows that the roscoelite in part replaces argillite. All that can be stated of the relation of gold and roscoelite at this mine is that the two are rarely in contact, though gold-bearing quartz is usually adjacent or near to zones showing roscoelite. Where associated, both minerals have relations indicating that they were primary constituents of the vein. Pyrite and arsenopyrite are conspicuous in the concentrates, although these do not exceed a few per cent in the ore. The average grade of the ore is low, but small lenses often yield several hundred pounds of ore worth from \$10 to \$50 per pound.

"Manganese oxide is present in the superficial zone, but available data do not warrant any statement of the influence of downward enrichment."

Ref. Pardee and Hewett 14:97 (quoted)  
Hewett 31:8, 10, 27

#### BIG PINE GROUP (Gold)

Cracker Creek District

Owner: Frank Davenport, Baker, Oregon.

Location: West half of section 31, T. 8 S., R. 36 E., elevation around 5,000 feet.

Area: 2 claims and fractions of others.

Geology: Argillite strikes north 10 degrees west and dips 25 degrees W. intruded by quartz veins up to 2 feet in thickness. Vein is developed on south side of creek by 30-foot tunnel showing considerable sulphide. This opening lies about 30 feet above the creek bed.

On the north side of the creek development consists of 2 tunnels, shaft, and crosscut. The country rock is argillite, sheared and crossed in all degrees with numerous large and small faults, fractures and slips. The "ore" consists of sheared argillite filled in with a multitude of small veinlets. The larger quartz veins contain numerous angular fragments of argillite. There are only small

amounts of sulphide. This wide and indistinct zone apparently dips to the east but varies frequently as does the attitude of the argillite itself. The vein is said to run from \$.80 to \$3.00 on an average. Most of the tunnel was caved, lower tunnel being inaccessible.

Informant: F. Davenport through J. E. A.

Dated: September 26, 1938.

#### BUCKEYE MINE (Local name)

Sipe (James B.) Mining Co. (Gold)

Cracker Creek District

"Office: 516 Federal St., Pittsburgh, Pa. James B. Sipe, Pres.; Chas. F. Knapp, Sec.-Treas., both of Pittsburgh. Capital stock \$500,000; par value \$1.00; all subscribed, issued and paid up. (1912 report. Dissolved January 5, 1914.)

"On the divide between Rock creek and the head of East Cracker creek, about 2 miles north-east of Bourne, is the Buckeye mine, the property of the Sipe Gold Mining Company. Most of the development of this property has been accomplished in the last 10 years. There is about two-thirds of a mile of drifts and raises upon the property, most of which is on the Cracker creek side of the divide. The strike of the main vein is N. 60 degrees E. and the dip is approximately 70 degrees SE. Besides the main vein there are narrow branch fissures containing limited quartz lenses in which are frequently found excellent specimens of coarse free gold. In the 2 tunnels on the Cracker creek side the vein averages about 4 feet wide, and is said to have a good grade of ore for a considerable part of the developed distance.

"The tunnel next below, or No. 3, about 300 feet below the one above, followed a branch fissure for at least 1,000 feet before crosscutting back to the main ledge, which was finally encountered late in 1914. Development in 1915-1916 was continued upon No. 3 level."

Ref. Parks and Swartley, 16:204 (quoted)  
Swartley, 14:160  
Pardee & Hewett, 14:94  
Hewett, 31:32

#### BUNKER HILL MINE (Gold)

Cracker Creek District

"On the Bunker Hill the vein shows quartz croppings of enormous extent; the developments here also exceed 1,000 feet, and the quartz is said to assay from \$3 to \$7 and over. Three claims,

the Bunker Hill, Myrtle, and Lilac, are owned by a Canadian company. The vein struck by the 300-foot crosscut is said to be 25 feet wide."

Present ownership of this property unknown. It is on the SW. extension of the North Pole-Columbia Lode and has been idle for years.

Ref. Lindgren, 01:667 (quoted)

#### CLIMAX MINE (Gold)

Cracker Creek District

"The Climax vein is about 600 to 800 feet northwest of the Columbia and Golconda mines. The vein fissure is approximately parallel to the North Pole-Columbia fault; apparently it was formed by the same fault movements. The Climax vein is similar to the North Pole-Columbia vein in every respect except size; the zone of intense shearing is from a few feet to 10 or 12 feet wide.

"The fissure has been explored through adits by several hundred feet of drifting; it is traceable on surface for several claim lengths. An ore shoot about 50 feet long by about 100 feet deep was worked out in the early days. Recent preliminary work conducted by the owner, Grayson Hinckley, has exposed some ore in the bottom of one of the drifts and on surface beyond the face of the underground workings. Preparations were under way to ship ore mined in the course of further exploration."

Ref. Lorain, 38:20,21 (quoted)  
Parks and Swartley, 16:56  
Swartley, 14:159  
Hewett, 31:17

#### CRACKER CREEK GOLD MINING CO. (Gold)

Cracker Creek District

Delaware Holding Corporation organized 1938, officers, Paul C. Murphy, President, Portland, Oregon; C. B. Lowe, Secy., Portland, Oregon; and A. A. Figen, Minneapolis, Minnesota, Treas.

Property: This is a consolidation of the properties of the Columbia Gold Mining Co. Tabor Fraction, E and E, North Pole, Homestake, Golden Gate and Hanover claims, together with water rights making a large acreage along and near the North Pole-Columbia Lode. The total length along the lode of the above named properties is 10,428.9 feet. Transfer of properties by deed was made and recorded late in August, 1938. On September 8, 1938, the consolidated property was leased for 99 years on a royalty basis to the Campbell-Oregon Gold Mining Corporation, also a Delaware corpora-

tion, address 84 William St., New York. R. Potter Campbell, Pres., Anton G. Hardy, Secy.-Treas. For details turn to North Pole-Columbia Lode.

Work began in the fall of 1938 in cleaning out and retimbering the workings, repair of buildings, and an exhaustive examination and sampling of the mine above the water level.

This will take several months. If the results are favorable, a large operation will result.

Ref. Lindgren, 01:659-663  
Swartley, 14:146-159  
Parks and Swartley, 16:59-  
Pardee and Hewett, 14:89  
Hewett, 31:8, 10, 28, 32  
Lorain, 38:19

#### CRACKER-OREGON MINE (Gold)

Cracker Creek District

A vein paralleling the North Pole-Columbia Lode, about 1,800 feet southeast of it. The principal workings are located in the north end of the town of Bourne. There is considerable development on a lode of a type similar to the others in the argillites of Cracker creek. It has a 10-stamp mill, with plates and 4 vanners for concentrating, but the property has produced but little and has been idle for some years.

Ref. Swartley, 14:159

#### GOLCONDA-CONSOLIDATED GOLD MINING CO.

Cracker Creek District

The Golconda Mine controlled by the Jackson estate of Portland, Oregon, is on the North Pole-Columbia Lode immediately SW. of the Columbia mine (near a part of the Cracker Creek Gold Mining Co.), with 3,000 feet along the lode. There has been but little activity here since 1905 until recently when a leaser began mining by hand methods and shipping to a smelter.

Geology and other details are given in the North Pole-Columbia Lode description.

Ref. Lindgren, 01:665  
Swartley, 14:146  
Park & Swartley 16:100  
Pardee & Hewett, 14:92  
Hewett, 31:28  
Lorain, 38:20

#### HEMLER (GEORGE E.) CLAIMS (Gold)

Cracker Creek District

"These 5 claims are about 2 miles north of the Columbia mine on Fruit creek at an elevation of about 7,500 feet.



"The principal veins are the Gold Nugget and Boise Belle, which are about 150 feet apart, each with strike NE.-SW. and dipping 75 degrees SE. The Gold Nugget vein varies from 5 to 9 feet in width and the Boise Belle vein 4 to 5 feet.

"Development consists of several open cuts, but the work is now confined to an adit intended to cut both veins.

"The country rock is granodiorite and argillite with vein cutting both. It has a porphyry dike in with the vein and good gouge on footwall of vein. The widths above given include the dike. The ore is from 3½ to 4 feet wide. Values are from \$4 up, but the general average is about \$10 per ton. There is plenty of water and timber, a good wagon road to the property and the power line of Eastern Oregon Light and Power Company is only 1 mile away. The above information is from the owner." Ref. Parks and Swartley, 16:118 (quoted)

**IBEX GOLD MINING COMPANY (Gold, Silver)**  
Cracker Creek District

An operating corporation: P. D. McTavish, Pres., 310 Rogers Bldg., Vancouver, B. C.; L. E. Guselle, Secy., Vancouver, B. C.; W. C. Fellows, manager and attorney-in-fact, Baker, Oregon. Capitalization \$30,000, par value 1 cent, common; \$70,000 preferred par value \$10.

"The Ibex and Bald Mountain mines are near the head of McCully creek, 7 miles from Sumpter. These two mines are on the same fissure and at present are being developed as one mine by the Ibex Gold Mining Co. W. C. Fellows, Baker, Oreg., is vice president and manager; P. S. Anderson is superintendent.

"The vein is in a fault fissure in argillite. The strike is N. 25 degrees to 60 degrees E.; dip 60 degrees to 80 degrees southeast. The fissure is said by Lindgren to be traceable for several miles along the outcrop; it has been explored by several thousand feet of underground workings. The sheared zone is from a few feet to 30 feet wide. Quartz veins up to 5 feet wide have been developed on both the Ibex and Bald Mountain properties. The veins that outcrop at about 6,300 feet elevation were developed originally through adit drifts. An ore shoot 600 to 700 feet long was developed in the Ibex mine and another ore shoot several hundred feet long was developed in the Bald Mountain mine. A large mill was built, but production was

small; apparently, the cost of operation was greater than the recovered value of the ore. The mill has been dismantled for some years.

"In September, 1936, the present company had just completed a 1,500-foot crosscut that cut the vein 380 feet below the old workings and about 1,000 feet below the outcrop. The fissure, where cut, was about 30 feet wide; 8 to 10 feet of crushed and highly sheared argillite was said to carry commercial values in gold. A narrow quartz vein within the shear was said to be very low-grade. Reliable information was received later to the effect that drifting on the vein had developed a low-grade ore body 29 feet wide.

"Sulphide mineralization is chiefly pyrite and arsenopyrite. Tetrahedrite and marcasite are reported from some parts of the vein; Lindgren mentions that pyrargyrite was found on the outcrop. The ratio of silver to gold is frequently high.

"The large mill and some other buildings left by former operators were in good condition. Preparations were under way for the construction of new living quarters and for the installation of modern equipment in the old mill.

"A small, gasoline-driven compressor supplied compressed air for development work. Hand-sharpened chisel bits gave satisfactory service in crosscutting.

"The underground crew consisted of 1 miner, 2 muckers, and a blacksmith-general utility man. The crosscut was driven at an over-all direct operating cost of \$12.70 a foot."

Since the above was written, drifting both ways upon the lode for about 600 feet has been done with crosscuts at intervals. Lack of finances has prevented work being done during 1938. In September and October, 1937, 113.86 tons were shipped netting \$1,403.50.

Ref. Lindgren, 01:637  
Parks & Swartley, 16:24, 127  
Pardee & Hewett, 14:95, 97  
Swartley, 14:144  
Hewett, 31:8, 10, 25, 17  
Lorain, 38:19, 22 (quoted)

**MOUNTAIN VIEW MINE (Gold, Silver)**  
Cracker Creek District

Owner: R. P. Anderson, Baker, Oregon.

"The Mountain View mine is 4 miles by road north of Bourne, at 7,500 feet elevation. It was being operated on lease by L. P. Harmon and C. A. Tibbs.

"The vein is in argillite, practically on the contact of the southern edge of the Bald Mountain batholith. The argillite is lighter colored and more fissile than in most mines of the district. The ore consists of veins and disseminations of sulphides, chiefly arsenopyrite, in talcy gouge and silicified argillite.

"Between 1904 and 1906 the mine is said to have produced about \$100,000 in gold from about 5,000 tons of ore. Two stopes were worked from the adit level about 265 to the surface. The stopes were either on different fissures or on faulted segments of the same fissure. The vein strikes N. 45 degrees E. and dips steeply to the southeast.

"A shaft, now full of water, had been sunk 100 feet on the vein and a drift driven under one of the ore shoots. The ore blocked out was never mined. The present operators had exposed the vein for about 100 feet along the bottom of the adit and were preparing to stope by underhand methods. The vein was 3 to 4 feet wide in its widest parts. A car of high-grade ore had been shipped from surface workings."

Ref. Swartley, 14:159  
Parks & Swartley, 16:158  
Lorain, 38:19-23 (quoted)  
Pardee & Hewett, 14:93  
Hewett, 31:14

#### NORTH POLE-COLUMBIA LODE (Gold)

See Cracker Creek Gold Mining Co. for ownership, etc.

"The North Pole-Columbia Lode, roughly paralleling the Ibex, Bald Mountain and Mammoth veins, and approximately a mile and a half northeast of them, is the most extensive gold lode in northeastern Oregon. It can be traced from near McCully's fork northeast to Rock creek, a distance of about 6 miles, by its frequent and often-times prominent outcrops of brecciated argillite cemented together with quartz. Considerable development has been done upon many claims between McCully's fork and Silver creek, among which are the Bunker Hill, Analula, Amazon, Mayflower and Mountain Belle, located upon the two branches of the vein which splits upon the Golconda property.

"These claims just mentioned southwest of the Golconda, although having considerable development upon the lode, which is frequently very wide and highly silicified, have produced practically no ore. They have been either abandoned, patented

and lying idle, or else development is confined to the annual assessment work.

"The properties which have a record of considerable production beginning with the one farthest southwest, are the Golconda, the Columbia, the Taber Fraction, the Eureka and Excelsior, and the North Pole. The South Pole, upon the same lode and adjoining the North Pole on the northeast, has but a small record of production.

"The country rock is the usual black siliceous argillite, sometimes schistose, but more often massive. In addition to the argillite there is near the vein on the Golconda on its footwall side a body of greenstone, while on the hanging wall side of the Excelsior and North Pole claims is another body of the same rock which appears to have been an intrusive sheet or sill.

"The exposed granodiorite intrusion to the west and north, although at considerably higher elevations, is at no point as much as 2 miles away. The presence of frequent granitic dikes, especially in the vicinity of the northeastern part of the lode, points convincingly to its presence below the surface at much less distances.

"These dikes are usually granodiorite porphyry, although near the divide between Silver creek and McCully's fork, kersantite lamprophyre was observed. Away from the lodes these dikes are sufficiently fresh to determine their character, but those within the lode have been altered to such an extreme that their original character can only be inferred.

"By reference to the section showing the developed portions of the lode, attention is called to the fact that the northeast or South Pole claims which extend over to the Rock creek slope include the highest part of the lode, and is in close proximity to the granodiorite intrusion which is about one-half mile north of the South Pole tunnels. This high ridge has dikes in great profusion. They become less frequent as one goes down the hill toward the E. and E. shaft, although they are not absent even as far as Golconda ground.

"The crosscut on the Yankee Jim claim shows a considerably altered granodiorite-porphry dike 50 feet wide, with quartz and sheared argillite upon both sides of it.

"In tunnels 5 and 3 of the North Pole mine, in the face of the Excelsior adit north on North Pole ground, in the Columbia, and in the Bonanza, is

found a greenish-white rock which is probably a porphyry that has suffered extreme alteration and has been impregnated with pyrite. In thin sections of this dike material the feldspars are so badly altered as to be indeterminable. It is simply an aggregate of sericite, kaolin, secondary quartz, feldspar and chlorite. Field evidences, together with the examination of hand specimens and thin sections, indicate that this intrusion, found at various points in the vein over a distance of more than 3 miles, in which the various specimens are strikingly similar, was originally a granodiorite-porphyry. Its extreme alteration indicates that it came into the plane of the vein, although probably not in a continuous sheet, at a time previous to the formation of the vein.

"The lode at Silver creek strikes approximately N. 60 degrees E., but changes its strike to the northward until upon the North Pole hill it is N. 30 degrees E. Its dip in Columbia ground is about 60 degrees S.E.; in the Eureka-Excelsior 70 degrees to 75 degrees; and in the North Pole 75 degrees to 80 degrees.

"The lode is easily traced by its croppings of silicified argillite wherever rock in place comes to the surface. The most prominent outcrops are those upon the Golconda, which projects at least 20 feet above the adjoining country rock and upon North Pole ground, where an exposure of quartz is some 300 feet wide.

"The width of the lode in the Golconda as determined in the workings is about 175 feet in the upper levels, and about 100 in the lower. In the Columbia it is shown upon the surface to be about 75 feet wide, and averages about 28 feet on the 900-foot level. In the E. and E. the vein is as much as 30 feet wide. In the North Pole, although it has the wide exposure of white quartz above referred to, underground the lode shows from 7 to 40 feet wide except one crosscut in No. 2 tunnel, which, according to the maps, is in quartz for more than 150 feet, indicating that the large exposure upon the surface above the portal of No. 4 tunnel may extend downward indefinitely in a sort of quartz chimney. The mine maps indicate that development in No. 1 tunnel below and between No. 2 and the surface has been almost entirely confined to drifting with but few crosscuts, so that this probability is not demonstrated. The foot-wall vein on the dike in the Yankee Jim crosscut

is about 16 feet wide. A cave prevented the observation of the hanging wall vein in this same crosscut, but it is said to be several feet wide. Although the lower tunnel is 1,200 feet long on the South Pole, practically no crosscutting has been done to determine the width of the lode, but it evidently will average more than 10 feet.

"The walls of the lode on the North Pole ground are fairly well-defined fault planes, especially the footwall. The Columbia is similar to the North Pole, the walls being fairly well-defined. The Golconda is between two usually well-defined walls.

"J. T. Pardee, (09) in his description of the faulting and vein structure of the Cracker creek district, states:

"— this wide zone is a normal fault, which has a vertical displacement of at least 400 feet and a horizontal displacement of approximately 1,800 feet.

"This considerable movement brecciated and pulverized the material between the walls, which in part at least was the location of an intrusive dike of granodiorite-porphyry. Along this dike faulting occurred in a series of movements because it was a plane of weakness ever since the first fracturing that permitted the introduction of the dike. This movement brecciating this argillite zone was probably at about the same time as other vein fracturing in eastern Oregon, or some time in the later stages of the cooling of the Bald Mountain intrusion.

"This wide brecciated zone made an excellent channel through which the waters driven off from the cooling interior could ascend. These ascending waters, rich in silica, flowing more freely in some places in the zone than in others, deposited variable amounts of quartz from place to place, so that in the lode we have everything from slightly altered argillite to massive quartz. While much of this quartz is the filling between the argillite fragments, still a great deal of it replaced the argillite. This replacement was made so completely in places that only fine specks of carbon remain to indicate that where the quartz now is was once an argillite that contained elemental carbon.

"The ascending hot solutions, besides the quartz, carried in solution and deposited with the quartz many different metallic sulphides. Those of much significance were arsenopyrite, pyrite, and to a lesser degree chalcopyrite. These sulphides in which is practically all of the silver and gold, ex-

cept in the shallow oxidized parts of the vein, are not disseminated throughout the lode's entire width, but occur in shoots upon one wall or the other, and occasionally at intermediate positions. Most of the massive quartz does not contain to exceed \$1 per ton in gold, while much of the less altered argillite is of low grade. The best values are more frequently contained in highly-replaced argillite, and often bear a close relation to a gouge streak.

"The gold occurs chiefly in fine arsenopyrite. There is also iron pyrite which is usually of lower grade. The ore is usually in a series of overlapping lenses, which make up the several shoots found in the developed part of the lode. These lenses vary from a mere seam to 25 feet in width. The average width of all the ore stoped in the North Pole mine is a little more than 3½ feet. While figures are not available as to the width of the ore stoped in the E. and E. mine, it probably approximates this figure. The Columbia ore reserves at the present time average 47 inches width. The Golconda averages are not available, but the maximum width stoped is 25 feet, and doubtless the average for the mine would approximate the figures for the other properties.

"With the exception of the Columbia's excellent systematic assay maps there are none available for this lode. Probably such maps have never been made by the other companies.

"It will be observed in the figure that the shoots in the Columbia property have no regular pitch in one direction in the plane of the vein, although they are fairly regular and persist to the lowest limits of development. In the other properties we have only the limits of stoping shown and these stopes, especially on the North Pole ground, are of such great horizontal length compared with their depth that a pitch cannot be asserted.

"The form of the stopes in the sketches and drawings available to the general public has caused many to assume that the shoots so far stoped have been the result of a downward enrichment, but when a few facts are considered it is apparent that little downward sulphide enrichment occurs. The arsenopyrite, which carried the greater part of the gold, is a primary material, and is unknown as a secondary constituent of ores enriched by descending sulphate solutions. Very few occurrences of secondary pyrite have been recorded from sulphide

deposits in western United States, and chalcopyrite in the greater number of its occurrences is clearly primary. The gangue minerals are quartz and calcite.

"As already stated, the gold is found in the arsenopyrite, the pyrite containing but low values of that metal. The arsenopyrite and quartz in many places show comb structure, thus indicating successive depositions of these primary minerals from ascending thermal solutions. Frequently whole masses of the first-deposited quartz and arsenopyrite have been shattered and recemented by a second deposition of quartz, which contains pyrite. Another phase in the mineralization that often occurs is a further brecciation and the filling of the minute fractures with calcite. Pyrite and arsenopyrite, which are characteristic of the lower vein, occur with the calcite. All of these successive mineralizations are the product of ascending hot waters. It would be rather difficult to account for the mineralization of the vein by the process of downward enrichment due to the occurrence of oxides of manganese found in some parts of the lode, which has been used by some as evidence favoring the downward enrichment theory. The presence of calcite occurring as the last phase of mineralization was overlooked, and it is, of course, a well-known fact that this mineral will nullify the dissolving action of manganese upon gold.

"The fact that in many of the mines the ore has been stoped practically to grass roots would indicate that no lessening of value due to the leaching of the upper portion of the vein has taken place.

"A very superficial enrichment of this type of vein may be caused by erosion and the leaching of calcite, which causes a removal of a valueless element, thus leaving a smaller mass of richer ore; and also by a mechanical concentration of the fine gold along channels caused by fracturing and the removal of calcite by solution.

"A casual examination of the underground workings, together with an inspection of the plans of the five mines located upon the developed portion of this lode, brings out the fact that, with the exception of the Columbia, but little systematic crosscutting has been done on the various levels of the various properties.

"While the ore shoots are more often located upon or in close proximity to the footwall they

are not all so located. In the Golconda the lode is very wide and some crosscutting has been done which disclosed shoots upon both walls and an intermediate one cutting diagonally across from the foot of the hanging wall with a dip of 30 degrees. In the Columbia a shoot is found not only on the footwall of the vein but also on the hanging wall, and in one instance in an intermediate streak. Below the shaft the only shoots found are upon the footwall of the lode. In the E. and E. the shoots are found upon the footwall. In the North Pole they lie occasionally upon the footwall but more frequently away from it, and occasionally upon the hanging wall. In the South Pole the development is practically confined to the hanging wall.

"It will also be noted that there are 2,500 feet on the North Pole hill between tunnel No. 5, on the North Pole, and No. 3, on the South Pole, which has had no drifting in the lode. It will also be seen that No. 1 tunnel on North Pole ground, which has no crosscuts, does not extend underneath the full length of the shoot above. Between the E. and E. shaft and the apex of the ridge, and above its 7th level, there is a million square feet of lode without development, above which there has been over a great part of the distance ore extracted or evidences of it discovered as the result of widely-separated prospect holes.

"There is a very incomplete development between the walls by means of crosscuts where drifting has been done along the strike. Considerable lengths have not even a single drift, while beneath the known shoots of ore, development has not been done in much of the ground to determine whether barren levels occur between bodies of ore, such as is found to occur in the Columbia on the 300-foot level north, where the wall is a carbonaceous argillite.

"The percentage of recovery at the North Pole mill from 1895 to 1908, in treating approximately 158,000 tons of ore, averaged \$12.22, or approximately 75 per cent. At the E. and E. mill between 1891 and 1905 the recovery was no more than 63 per cent. The percentage of recovery at the Golconda mine is not available throughout a considerable period of its activity, but, to illustrate, the percentage of recovery was 68 per cent from 16,515 tons treated from February 1, 1903, to February 1, 1904. The Columbia secured the highest extraction of any, although the exact figure is not

available for publication, but owing to the nature of the milling plant it is necessarily low.

"The Golconda, Columbia and E. and E. mines are equipped with 20 stamp mills; the North Pole has a 30-stamp mill. The average daily tonnage capacity for the 20-stamp mills probably was below 50 tons, with a probable present maximum of 2,000 tons a month at the Columbia, while the tonnage capacity for the 30-stamp mill did not exceed 65 tons daily throughout any one year.

"These small capacities and the consequent high milling costs in conjunction with the large losses in the tailings demand a high average grade of ore. The total mining costs cannot very well be kept below \$6 per ton, and without efficient management it will exceed that figure. With a 75 per cent extraction an ore averaging \$8 is the lowest that can be mined.

"The total production from the entire lode, estimated to January 1, 1915, is somewhat in excess of \$8,000,000. The smallest production from any one of the properties amounts to more than \$400,000. The recovery of \$8,000,000 was secured from the several properties, whose combined efficiency from beginning to end does not exceed 67 per cent. The losses, therefore, in the tailings from these mills, was \$4,000,000. The lowest acceptable percentage of recovery in present practice is 90 per cent, which signified that \$2,800,000 could have been saved in modern mills. If the present milling practice were continued until the production from this lode were doubled, the losses in excess of a permissible minimum recovery would be more than \$1,000,000.

"These statements might, at first thought, appear to be a reflection upon the persons who have operated these properties, but it must be borne in mind that their plants, though possible of improvement from time to time, were nevertheless installed before recent development in cyaniding complex ores or concentration by means of flotation had become available."

Ref. (see Cracker Creek Gold Mining Co.)  
Parks & Swartley, 16:59 (quoted)

#### PRICE ANDERSON GROUP (Silver, Gold) Cracker Creek District

The Price Anderson group is 10½ miles from shipping point, Sumpter, on the Sumpter Valley Railway. Located several years ago and recorded

in Baker county. Consists of a group of 3 unpatented claims, located in a high mountain area; the country rock is slate, vein strata bearing northeast and southwest; width 4 feet. Water is scarce; power is available from Eastern Oregon Light & Power Company, nearby; timber on claims. Claims are now idle, and there is no surface equipment. Developed with a crosscut tunnel. Owner is R. P. Anderson, Baker, Oregon.

Informant: Prescott, 37.

### SOUTH POLE MINE

Cracker Creek District

Owner: R. P. Anderson, Baker, Oregon.

While most of this property is on the Rock Creek side of the divide it is placed in the Cracker Creek district because it joins the North Pole mine on the NW. and is on the North Pole-Columbia Lode. See North Pole-Columbia Lode for description. Has been idle for years.

Informant: Prescott.

## EAGLE CREEK AREA

(Eagle Creek, Keating, and Sanger Districts)

### Geography:

The Eagle Creek area includes all the north side drainage of Eagle Creek and the drainage from the south side above Martin Bridge. It also includes the north side drainage of Powder River in Baker County in the SE. corner of T. 8 S., R. 43 E., in which are Balm and Goose Creeks. The area is bounded on the east by the Cornucopia area; on the south by the Sparta and Virtue areas; on the west by the Baker area; and on the north by the Union County line.

Eagle Creek is an important stream with several branches that head far back into the Wallowa range. Upon these several branches which reach even to the western limits of the Cornucopia mining district are many quartz veins and placer deposits. There has been some activity in the development of quartz veins in the last year or two and the placers, although not as active as formerly, are worked in a small way.

The elevation varies from 3,500 feet on lower Balm and Goose Creeks to 8,000 on East Eagle Creek. Practically all of the district is covered with timber, only occasional small areas are barren.

### Geology:

Much of the area south of the Wallowa range and north of lower Powder River is covered by recent lava flows. Those areas not so covered are in part granite and in part old sediments and old lavas and volcanics. The steep slopes and high ridges which form the upper drainage area of Eagle Creek are made up of various sediments and old volcanic flows and breccias in considerable complexity. The lower foothills from a few miles west of Sparta to North Powder, where they are

not covered by Columbia basalt, are seen to be made up almost entirely of greenstones. A map of the area was published by Ross (38).

Much limestone is found in the upper drainage area of Eagle Creek. This limestone and the other sediments which are largely calcareous appear to have once covered much of this region but now only remnants which have escaped erosion remain. These limestones, sandstones and argillites have frequently been made schistose and crystallized by the mountain building forces which created the Wallowa range.

It appears probable that in this locality as elsewhere in the Wallowa region these sediments were laid down upon a wide belt of old lavas and breccias. Volcanic breccia is also frequently interbedded with them. These breccias and old flows have been generally altered and nearest to the Wallowa granodiorite intrusion have been compressed and altered into dark green amphibolitic schist.

### History:

The two branches of Eagle Creek which have received most attention in quartz and placer mining are East Eagle and Paddy Creeks.

On Paddy Creek considerable work has been done, most of which has been upon lens-like veins in sedimentary rocks. Although there is a mill upon one of the properties the production from occasional runs is small.

The placer mines of Eagle Creek have been worked ever since the late '60s, and each summer some placer mining is done. All along Eagle Creek there are benches of heavy gravel up to 100 feet above the stream. These benches have been worked to some degree from below the mouth of Paddy

Creek to a few miles upstream beyond the mouth of East Eagle Creek. Placer mines are also found both on upper and lower Paddy Creek.

The Sanger mines are located in the northern part of T. 7 S., R. 43 E., on the western side of Eagle Creek in a quartz and placer mining area which has a record of considerable production. There has been little activity outside of small placer mining operations since 1900.

Some of the ore deposits are several miles distant from the granitic outcrops of both the Wallowa range and the Sparta District, and may have been due to the intrusive influence of either or both. Because they are located in argillite and are to the north of Sparta they have for convenience been grouped with those others which were the undoubted product of the Wallowa and Sparta intrusions.

There are three large exposures of greenstone in the drainage area of lower Powder valley, only one of which is of much importance as a mining territory. One is west of North Powder, another is nearly surrounded by the most northerly bend of Powder River and is commonly known as Farley hills. No description of either of these greenstone areas will be attempted.

The third and at present important most area extends from Medical Springs south and east some 20 miles. This greenstone belt makes up much of the middle drainage area of the various creeks which flow southward from the Wallowa range into Powder River, of which Goose and Balm Creeks are the most important streams in relation to the prospects of this region.

The reader is referred to the properties located in this district for details of the ore deposits.

#### AMALGAMATED MINES CO. (Gold) Eagle Creek District

"The Amalgamated Mines Co. controls 21 unpatented claims near the head of Paddy Creek, in the southern part of the Wallowa Mountains. Most of the claims lie in sec. 35, T. 6 S., R. 44 E. Mrs. G. J. Burnham is mine manager at the property, and W. Burnham, Box 1928, Spokane, Washington, is secretary of the company.

"In addition to numerous prospect pits and small open cuts there is considerable underground work, much of which was inaccessible at the time of this survey (1933). The accessible workings con-

sist of two adits aggregating about 1,500 feet, including short crosscuts, as shown in Plate 3. The lower and upper adits are connected by a 40-foot raise.

"A small Chile mill, situated below the portal of the lower adit, had been in operation for only a few days in 1937. It was milling ore that had been stored from a previous period of activity. No assays were available. The mine foreman estimated the capacity of the mill at 25 tons a day. Water power is used, the water coming from the head of Little Eagle Creek.

"The principal country rock of the vicinity is fine-grained greenstone. Locally the rock is a coarser breccia; some conglomeratic beds are present and carry pebbles as much as 2 inches in diameter. The rocks are excessively jointed in several directions, so that hand specimens are usually bounded by joint planes. These rocks have been assigned to the Triassic by Lindgren (01) and to the Carboniferous (?) by Ross (38).

"At least two systems of faults are present. The representatives of the more prominent system trend northwest and dip northeast. Those of the other set also trend northwest but dip steeply southwest.

"Gouge is developed along the slips. The greenstone is in most places crushed along both walls of a fault, locally for a width of 20 to 30 feet. This condition is especially well seen at the places where the two crosscuts are turned from the main lower adit.

"Mineralization and alteration have taken place along some of the faults, and the rock is bleached in many places, locally on both sides of the fault and elsewhere on only one side. Sericite, fuchsite, limonite, and quartz were recognized in these zones. The mineralization has been variable, and any or all of the above minerals may be present or absent at any one place."

Ref. Gilluly, Reed, & Park, 33:63 (quoted)  
Parks & Swartley, 16:14

#### BALM CREEK GOLD MINING CO. (Copper, Gold) Eagle Creek District

Oregon corporation; capitalization \$150,000; office, Oregon City, Oregon; John Arthur, manager.

This was a merger of the Poorman, Mother Lode, Oregon Copper and Goose Creek properties with combined holding of over 100 claims in sec.

32-33, T. 7 S., R. 43 E., with about three miles of underground workings. A six-foot Marcy ball mill and flotation cells and auxiliary equipment were used. This plant has been removed and mine is idle.

Production during the active period from June, 1935, to January 1, 1938, was 8,108.848 ounces of gold and 4,047,015 lbs. of copper from concentrates and shipping ores with a total value of \$405,000. After deducting transportation costs and royalty of 10 per cent to Hamilton F. Corbett, the owner, (\$27,045.57), there was left for payment of production costs \$224,966.95. Total amount spent for construction and operating was over \$400,000. These financial and production figures are found in a letter to stockholders, dated January 11, 1938. Geology and other details are found in references given below, and private report by Waldemar Lindgren.

Ref. Lindgren, 01:732  
Lorain, 38:29  
Gilluly, 31:24-28  
Gilluly, 37:114  
Parks & Swartley, 16:181  
Swartley, 14:121

#### BASIN MINE (Gold) Eagle Creek District

Owners: C. L. Palmer and W. S. Sturgill, Baker, Oregon.

Area: 7 unpatented and 40 acres deeded land.

"The Basin mine, . . . , is an old property but has been actively exploited only in the last few years. It is about 3 miles north of the road between Medical Springs and the Sanger mine, just over the divide, on the Eagle Creek side.

"Production statistics were not available, but the output must have been moderate despite the very high grade of the ores.

"In 1930 the development work consisted of somewhat more than 600 feet of drifts, with some winzes, raises, and stopes. Most of the workings were on the adit level, with an inclined shaft reaching the surface about 30 feet higher.

"The country rock is quartz diorite throughout. It is cut by many joints and shear planes, the most prominent of which strikes N. 10 to 15 degrees W. and dip 25 to 30 degrees W., strike N. 60 degrees W. and dip 35 degrees S., strike N. 70 degrees W. and dip 15 degrees N., and strike N. 35 degrees E. and dip 20 degrees NW. Quartz veins and veinlets follow all these directions and many others. Most

of the veins are narrow and discontinuous, though many are very rich, showing specks of gold in the hand specimen.

"Three stopes are visible in the accessible workings. One is on a vein followed by an incline from the surface. This vein has been stoped for a distance of about 20 feet for a pitch length of about 40 feet above the tunnel level, along the inclination of the vein. The thickness of the vein in this stope is not known; to judge from the exposures in the walls, however, it did not exceed a foot, probably averaging between 4 and 8 inches. This ore shoot is evidently the objective of the winze below the tunnel level, but the winze was full of water and could not be examined.

"The other stopes are above the tunnel level, along a vein striking N. 60 degrees W. and dipping 35 degrees S. This vein has been mined just above the drift for a stope length of about 30 feet. The western stope is about 40 feet high along the dip of the vein; the eastern is somewhat smaller. The quartz vein was evidently somewhat thicker than the first one described but probably did not exceed 2 feet in thickness anywhere.

"The veins are all simple quartz-filled fissures along the joints. Most of them show a little shearing, dominantly in the hanging wall, but can hardly be classed as fault fissures. Considerable replacement of the wall rock has occurred. Sericite is rather common, especially along the shears. The vein matter is chiefly quartz and some chlorite and calcite, together with hematite, chrysocolla, and limonite, the oxidation products of the sulphides formerly present. A few relict sulphides occur, chiefly pyrite, chalcopyrite, and sphalerite. The quartz shows moderate brecciation.

"The gold is free, within the depths obtained in the mine. The ore is variable in tenor but is locally of very high grade, wire and shot is a necessity for workability; nevertheless, the mine appears to have good prospects if worked in a small way, the lack of persistence of the veins being taken into account."

Several press reports in 1937 indicate that a lower crosscut has been driven in 800 feet and cuts a narrow rich vein 500 feet in and a 3-foot vein at 300 feet upon which a raise is being driven 70 feet to the level above. The crosscut is expected to cut a third vein, the Palmer, at 900 feet upon which very rich ore was mined near the surface



but was cut off by a fault. This lower crosscut is expected to cut this vein below the fault. Property is equipped with buildings, compressor, etc.

Ref. Lindgren, 01:738  
Gilluly, Reed, & Park, 33:68 (quoted)

**BLUE BELL GROUP**  
(Copper, Gold)  
Eagle Creek District

Local name: Daddy Lode.

Owners: D. W. French, E. B. Cochran, D. W. C. Nelson, all of Baker.

Location: Located in the NW.  $\frac{1}{4}$  sec. 23, T. 7 S., R. 43 E., on a branch of Goose Creek. About 5 miles N. of the "Mother Lode", and W.  $\frac{1}{2}$  of NE.  $\frac{1}{4}$  of NW.  $\frac{1}{4}$  sec. 22, T. 7 S., R. 3 E.

Area: 10 unpatented lode claims.

History: First located about 1908. Never shipped any ore. Shaft 210 feet deep was sunk, together with 1,300 feet of tunnel and crosscut. C. C. Cox was owner for some time.

Equipment: None, except 2 cabins. Shaft house destroyed, shaft caved.

Development: Underground work mentioned above inaccessible. Four tunnels totaling over 1,000 feet were visited. Apparently no stopping had been done anywhere in them.

Geology: The country rock is siliceous argillite and chert, and a consolidated greenstone tuff. The chert bands strike on an average north and south and dip to the west. They are much faulted and offset; the variations in texture and lack of phenocrysts prove the sedimentary origin of this highly altered greenstone. Mineralization is wide spread in the form of disseminated chalcopyrite and some small sized radiating patches of solid sulphide. The greenstone is cut by numerous dikes of whitish intrusive which itself is impregnated with arsenopyrite. Some barite lies on the dump near the shaft.

The property is relatively inaccessible but reached by a forest road nearly 10 miles north of Keating. Timber and water are abundant.

Informant: D. C. W. Nelson through J. E. A.

**BURKEMONT MINE (Copper, Gold, Silver)**  
Eagle Creek District

Owner: Frank DeKlotz, Filer, Idaho.

The mine was located 45 years ago by the then Judge T. C. Burke, later of Portland, and consists of a group of 6 patented lode claims, 280 acres of

timber land and 80 acres of townsite, all platted out and on record. Located in a hilly area; the country rock is diorite and greenstone; vein is east and west; width 12 feet to 30 feet. Minerals are copper, gold, and silver; water is ample from creek; timber on claims; power 3 miles away. Mine is now idle; no surface equipment is left, but was developed with a double compartment shaft 400 feet deep. Mine is on same zone as the Balm Creek Gold Mine, about 6 miles west.

Informant: Prescott.

**CLOVER CREEK COPPER MINE (Copper, Gold)**  
Eagle Creek District

"The property of the Clover Creek Copper Co. is on Clover Creek in sec. 35, T. 7 S., R. 42 E., and comprises a large block of claims.

"Prospecting for copper has been carried on for several years in the valley of Clover Creek in the west-central part of sec. 35. For some years the claims were held, together with those of the present Oregon Copper Co., in the adjacent Pine quadrangle, by the Mother Lode Copper Co. In 1928, they were taken over by the Clover Creek Copper Co.

"The developments in the west-central part of sec. 35 at the time of this survey included several shallow trenches and a caved tunnel reported to be 400 feet long. A head frame had been erected, and preparations were being made for a shaft on the west side of Clover Creek near this old prospect tunnel. Another tunnel half a mile to the south, near the south line of the section, was being driven northeastward and was about 1,300 feet long in August, 1929.

"All the claims of the Clover Creek Copper Co. are in the Clover Creek greenstone. At the south end of the property the attitude of the rocks is uncertain, but just north of the old caved tunnel on Clover Creek tuffaceous members strike eastward and dip steeply to each side of the vertical. The rocks appear to form an isoclinally folded series.

"The rock is cut by innumerable fractures and shear surfaces, characteristically coated by chlorite. In the new tunnel the most prominent shear planes strike generally within 30 degrees of north, chiefly N. 10 degrees to 30 degrees W. Most of them dip west at rather steep angles, but many have easterly dips. Some very prominent shear zones trend about east. This seems to be the dominant trend at the northern prospects.

"The new prospect tunnel was being driven to cut beneath oxidized bodies of gossan which contain barite, malachite, jarosite, limonite, and casts of sulphides. At the time of this survey a few narrow stringers of quartz and manganiferous ankerite, with associated pyrite and small amounts of chalcopyrite, had been intersected, but the tunnel had not reached a point below the most prominent gossans.

"Near the old caved tunnel there is considerable evidence of mineralization. A 4-foot vein of barite crops out just east of Clover Creek opposite the new head frame, and much barite is disseminated through the gossan outcrops on both sides of the creek. The gossans extend in two subparallel zones about 200 feet apart in a general easterly direction. They range from a few feet to about 20 feet in width. They appear to be of low grade.

"Little can be determined from the surface exposures as to the shapes of the mineralized bodies of which these are outcrops, but from analogy with the bodies exposed in the Oregon Copper Co.'s property, a few miles to the east, they are probably also replacement bodies of irregular but roughly tabular form.

"The presence of considerable pyrite and a little chalcopyrite in fragments of fresh rock on the dump of the caved tunnel implies that the oxidized zone is shallow. A grab sample, collected by the writer, of highly pyritic rock from this dump showed 0.40 per cent copper and 40 cents in gold to the ton (gold at \$20.67 an ounce)."

Ref. Gilluly, 37, 107 (quoted)  
Gilluly, 31:28

#### COPPER BUTTE GROUP (Copper, Gold) Eagle Creek District

"These claims are located on upper Clover Creek in sec. 24, T. 7 S., R. 42 E. The region in which these claims are located is made up of low hills, some of which are capped with basalt and many of which are partially forested. The older rocks are the typical greenstones. Surface alteration has made it difficult to determine their exact character, but many of them are undoubtedly amygdaloidal with calcite filling. One of these flows near Copper Butte, which apparently makes up the horizon of economic interest, has been very badly shattered. In fact, the whole flow seems to have been sheared in a very irregular manner. Although it probably can not be called a shear zone, still this shattering serves the same purpose since it permitted easy

access for the circulating waters to do their work of deposition.

"In many of the joint cracks cuprite and chalcocite have been deposited. Some of the chalcocite stringers are as much as one inch in thickness. Chalcocite is also found disseminated in many places in the shattered greenstone. The exact thickness of this flow which contains chalcocite and cuprite could not be determined. It appears to be flat lying and from 60 to 70 feet thick. The upper part is highly amygdaloidal, while the lower part, as shown in a shallow shaft, is dense in character. The development work has not been of such a nature as to give even an approximate idea of the amount of metal available. A few short tunnels and shallow shafts have been made on the richer stringers. Surface crosscuts and crosscutting raises would best determine how much of the flow contains copper.

"This property known under the various names of Gilkeson, Copper Butte, and Copper Queen (see) had at one time a small furnace constructed upon it. The slag rich in copper from this small furnace can still be found nearby. It is reported that about 100 tons of 12 per cent copper were shipped in early days, and some copper ore of lower grade is seen upon the dumps. If this is a flat deposit, as before intimated, the development, which was done before the idea of disseminated copper in shattered zones became as well understood, was evidently done in an attempt to determine whether the ore went down or not. Shafts and other development soon reached the dense part of the flow which proved disappointing, and development ceased."

Ref. Lindgren, 01:732  
Parks & Swartley, 16:71 (quoted)

#### COPPER CENTER MINE (Copper, Gold) Eagle Creek District

Owner is J. A. Gyllenberg, Baker, Oregon.

Mine was located 50 years ago, and consists of a group of 5 unpatented lode claims. It is located in a hilly area; the country rock is greenstone; vein bearing northeast and southwest; width 200 feet. Water ample; power generated with gas engine; timber from government land close by. Two men employed in operation. Developed by 200 feet of tunnels; one shaft 50 feet deep. Some high grade copper has been shipped, and the mine is now under further development.

Informant: Prescott, 37.

## COPPER QUEEN MINE (Copper, Gold)

Eagle Creek District

"The old Copper Queen mine, sometimes called the 'Copper Butte', is just southwest of Crane's mill, near the west edge of sec. 24, T. 7 S., R. 42 E. It is on a good road about 8 miles from Keating post office and 28 miles from Baker.

"The copper deposits at this place have been known for over 60 years, for Raymond's report of 1873 states that 'W. B. Crane & Co. sold their copper mine (at Copper Butte) to Messrs. Carson, Williams & Co., of Detroit, Mich. A furnace was erected, and 4½ tons of copper was produced. For a long time after this the workings were idle. Up to 1900 about 100 tons of 12-per cent copper ore were reported to have been shipped. No report of further activity was received until 1923, when, according to Hill, the property was reopened 'with a view to supplying the Sumpter Valley smelter with fluxing ore.' Since that time no activity has been reported at the property. The early production and the test lots for the Sumpter smelter from this property and the Poorman group (now owned by the Oregon Copper Co.) constitute the only reported copper production from the Keating District. The mine was dismantled at the time of this survey in 1929.

"The workings consist almost wholly of shallow surface cuts, but there are also a few short tunnels and shafts. None of them was accessible in 1929.

"The country rocks include amygdaloidal and tuffaceous members of the Clover Creek greenstone. Their structure is obscure, but they are cut by many fractures, the most prominent of which strike northwest and have steep dips. Along these fractures the rock is coated with oxidation minerals—malachite, azurite, chrysocolla, and cuprite—which also permeate the greenstone along the joints. A specimen of cupritic material from this locality assayed 20 per cent copper and 40 cents in gold to the ton. The ore body is probably due to the oxidation of chalcopyrite originally disseminated through the greenstone along the fractures and replacing the body of the rock. Mining below the shallow oxidized zone was evidently not profitable."

Ref. Lindgren, 01:732  
Swartley, 14:120  
Gilluly, 31:30  
Gilluly, 37:109 (quoted)

## CRYSTAL PALACE MINE (Gold)

Eagle Creek District

"The Crystal Palace mine, controlled by S. A. Work, of Boise, Idaho, is about 2½ miles west-southwest of Sparta. Its production has doubtless been small, but figures are not available.

"The property is developed by two tunnels 80 feet apart vertically and by inclined raises and winzes from them. The workings aggregate about 2,000 feet.

"The country rock is albite granite, cut by diorite porphyry dikes (not separately mapped) and by several much younger basaltic and diabasic dikes that range in thickness from less than an inch to 20 feet.

"The granite is sheared and locally silicified along these shear planes. Quartz veins follow several of these shear surfaces and probably are chiefly replacement veins localized by them.

"The vein is much more continuous and uniform in the upper tunnel than in the lower tunnel, where the most recent work has been done. In the upper tunnel its average strike is about N. 35 degrees W. and its dip about 27 degrees E., whereas in the lower tunnel it ranges in strike from N. 30 degrees W. to N. 60 degrees W. with a peculiar S-shaped curve. This curve may be due either to post-mineral or pre-mineral movement; the exposures are insufficient for clear decision. The vein quartz is more or less crushed, showing clearly that there has been post-mineral movement, but the amount is difficult to judge. In places the fissures contain no quartz and are marked by sericitic and ankeritic crush zones. The vein ranges in thickness from a knife-edge to about 7 feet, and the average is about a foot.

"The mineralogy of the veins is simple. The sulphides are pyrite and arsenopyrite in a gangue of quartz, sericite, chlorite, and ankerite."

Ref. Gilluly, Reed, & Park, 33:59 (quoted)

## DOLLY VARDEN (Gold)

Eagle Creek District

"This property, 8 miles southeast of Sanger and about the same distance north-northeast of Sparta, in sec. 18, T. 7 S., R. 44 E., is a big outcrop of rusty quartz and silicified shale developed by irregular surface cuts and pits. No regular veins are seen. This group, which has been abandoned for some years, was relocated in 1915 by Chas. Carna-

han and B. Martin, who report value per ton of \$7 to \$8 over a great width."

Ref. Lindgren, 01:739  
Parks & Swartley, 16:87 (quoted)

### EAGLE CREEK PLACERS

Eagle Creek District

"These placers have been worked ever since the late '60s and each season some placer mining is done. All along Eagle Creek there are benches of heavy gravel up to 100 feet above the stream. These benches have been worked to some degree from below the mouth of Paddy creek to a few miles up stream above the mouth of East Eagle Creek. Placer mines are found on both upper and lower Paddy Creek.

"It is reported that the deposits, both bench and stream, near the mouth of Paddy Creek and above on Eagle Creek, have been sold under lease and bond to the Prince John Placer Mining Company of Grand Junction, Colorado. It is not known whether it is an incorporated company or not.

"Press reports of June, 1916, state that 30 men were at work constructing a large ditch to carry water for hydraulic purposes."

Ref. Parks & Swartley, 16:88 (quoted)

### EAST EAGLE MINING & MILLING COMPANY

(Gold)

Eagle Creek District

Local name, Miller & Lane Group.

"Office: Baker, Oregon. J. A. Thronson, Pres.; E. S. Platt, Sec.; J. A. Thronson, Treas. Capital stock \$5,000; par value \$1.00; all subscribed, issued and paid up. (1916 report.)

"Located about 15 miles north of Sparta or 45 miles northeast of Baker, in NW. part of T. 6 S., R. 44 E. (sec. 5 probably), on the west side of the rather steep canyon of East Eagle Creek at an elevation of about 5,000 feet. The region is well timbered. Four located claims are owned and 5 claims under bond and lease to the company.

"The vein is of the saddle reef type, filling in the top of an anticline with a layer of greenstone below and a bed of argillite above. The axis of the anticline has a north-south direction and pitches to the north. Average width of vein is 4 feet and the average value is said to be \$8.50 per ton. Vein has been exposed by about 200 feet of tunnel along the crest of the fold. Crosscuts and small tunnels have shown that the width of the fold, where oc-

cupied by the quartz, is about 100 feet. It is possible that this saddle-reef vein was fed by a fissure, and as the principal vein breaks in the vicinity strike east-west and dip north, the driving of the tunnel north along the axis of the fold may bring the best results.

"The mine has a good-sized log boarding house, several smaller buildings, a 5-stamp mill run by water power, wilfley table, assay outfit, etc.

"There is another group of claims called the Woodard, about one-half mile west of this property and controlled by the company. Only a small amount of development work has been done on these claims."

Ref. Parks & Swartley, 16:88 (quoted)

### FORSTER AND THOMAS COPPER CLAIMS

(Copper, Gold)

Eagle Creek District

Local name, Sovereign mine. (Sovereign Consolidated Copper Company)

"Office: Baker, Oregon. J. A. Howard, Pres.; K. O. McEwen, Sec.; John Arthur, Treas. Capital stock, \$2,000,000; par value \$1.00; all subscribed, issued and paid up. (1913 report.)

"Six miles west of Sparta, in sec. 23, T. 7 S., R. 43 E., in timbered area. Elevation 4,000 feet. Wagon road to Baker, 25 miles. Lands, 3 claims. Dormant.

"The country rock is a dense greenstone, in places slightly brecciated and cut by small irregular quartz veins, which contain small amounts of galena, zinc blende and chalcopyrite.

"Company organized to develop the Sovereign mine, but the results were so discouraging that work ceased a few years ago. Property now being developed by H. C. Thomas and H. W. Forster."

Ref. Swartley, 14:124

Parks & Swartley, 16:209 (quoted)  
Gilluly, Reed, & Park, 33:62

### HIGGINS (WM.) AND EVELAND (CHAS.) CLAIMS (Gold)

Eagle Creek District

These men have located three claims near the Sanger mine, recorded in Baker County. They were located in 1933. Mineral is gold, and a small amount of silver, assays at \$18. Country rock is porphyry, hanging wall porphyry and footwall argillite; vein strata bearing north and southwest; width 2 to 3 feet in width, length 4,000 feet.

Informant: Prescott, 37.

**HILLSBORO GOLD MINING CO. (Placer)**

Eagle Creek District

Local name, Eagle Creek Junction placer mine.

"Office: Hillsboro, Oregon. J. W. Shute, Pres.; A. C. Shute, Sec.-Treas. Capital stock, \$6,000; par value \$1.00; all subscribed, issued and paid up. (1914 report.)"

"This placer mine is situated at the junction of East Eagle Creek with Eagle Creek, in sec. 6, T. 7 S., R. 44 E., and considerable development work has been done and equipment installed, but the total production is not available. It is patented ground and little work has been done the last few years."

Ref. Parks & Swartley, 16:124 (quoted)

**HILLTOP KEATING CLAIM (Gold, Copper)**

Eagle Creek District

Owner is Gust Schermer, Keating, Oregon.

Consists of one lode unpatented claim. Located in a hilly area. Country rock is greenstone and porphyry; vein bearing east and west; width 40 feet. Mineral is gold, also silver and copper. Developed with open cuts and a shaft 22 feet deep. Prospecting still being carried on. Water is scarce; timber close by; power about 3 miles. Claim is on the gold-copper zone.

Informant: Prescott, 37.

August 1, 1938, press report from the Mining Journal: Development work is progressing satisfactorily at the Hilltop Keating mine, six miles from Keating, Oregon. The mine is a cobalt and nickel deposit which also carries values in gold and silver. Trenches and small shafts have established the ore body as having a width up to 300 feet and to extend the full length of the claims held by Hilltop Keating. Gust Schermer, Keating, Oregon, is the operator.

**McINTYRE GROUP (Copper, Gold)**

Eagle Creek District

Owner: Claude McIntyre, Baker, Oregon.

Location: T. 7 S., R. 43 E., adjoining Mother Lode or Balm Creek Mining area.

Area: 11 unpatented claims.

No underground development. Poor open cuts and surface trenches.

Description: Property is in the same belt of mineralization as the Balm Creek holdings. Outcrops few and far between. The Old Man claim is a very good prospect, outcropping of gossan and

heavy "iron" quartz showing pyrite in spots. One of the claims has much float of baritic ore—no ledge or vein discovered as yet. Another point of prospective worth is that on the supposed continuation of the Balm Creek vein and Poorman vein—partially exposed but insufficient for sampling purposes. Main country rock is altered greenstone with capping of basalt and vesicular lavas. There is evidence of a subsided "crater" near the Old Man claim which would bear greater investigation. A granite exposure is said to occur near the mouth of Balm Creek. This property should have a systematic method of exploration, which might uncover veins of good width and of minable grade, especially in view of its proximity to the Mother Lode vein. Only "grab" sample assays have been made to date which are poor indications of possibilities.

Informant: A. V. Quine, Fall, 1937.

**PADDY CREEK MINE (Gold)**

Eagle Creek District

Owner: Mrs. A. Whiteker, Baker, Oregon.

"This property is located on Paddy Creek in sec. 15, T. 7 S., R. 44 E. A gold quartz property with crusher, 10 stamps and amalgamating plates. Had a small production from occasional operation of mill. Several hundred feet of development have been done in opening up lens-like veins in sedimentary rocks."

The vein is 1 to 5 feet wide. Mine is idle. (6-1-37.)

Ref. Parks & Swartley, 16:177 (quoted)

**ROY AND STURGILL MINES (Gold)**

Eagle Creek District

Owner: Claude McIntyre, 2029 Cherry St., Baker, Oregon.

Location: Near the center of the SE ¼ sec. 3, T. 7 S., R. 43 E. W. M.

Area: Two unpatented lode claims.

History: Both are said to have been discovered about 50 years ago, and have been mined for most of that time although only by one or two men. The Roy is said to have produced about \$100,000. The ore from the Sturgill was treated at the Sanger mill, and is said to have run about \$16.00 at old price of gold. Acquired by McIntyre in 1937.

Development: Roy said to be developed by 1,000 feet of drift. Sturgill by about 500 feet on two

levels (lower one full of water below creek level). Numerous small adits and open cuts. Ore stoped from 25 feet between levels. One narrow stope up 75 feet from upper level.

Miscellaneous: Timber abundant. Water plentiful. Snowfall 4 to 5 feet. Elevation about 4,400 feet. Good road (kept up by lumber company) about 14 miles to Medical Springs.

Geology: Country rock blocky argillite, cut by dioritic dikes, one of which lies just east of tunnel No. 8. Parallel lenticular band of limestone conglomerate (Martin Bridge formation ? Triassic) lies to the east. The argillite underground is seen to be considerably faulted, with altitudes ranging from N. 45 degrees W. to N. 50 degrees E. The vein trends from N. 10 degrees to N. 35 degrees E., and dips from 35 to 45 degrees E. At one point it is considerably disturbed, and appears to trend north and dip 30 degrees E. This is local. The vein is composed of iron stained quartz, more or less broken and crumbly, and in places very finely ground into a sugary texture. No primary sulphides are visible, and the gold is said to be entirely free. The sulphide zone is said to have been reached at a depth of 400 feet in the Sanger mine, a few thousand feet to the north. Faulting is normal, with displacements of 2 and possibly 20 feet noted. Some of the faulting is pre-mineral, some later.

The vein has been traced on the surface by means of shallow cuts and adits for nearly 1,100 feet north of the creek (Sturgill) and 250 feet south of the creek (Roy). A cross vein is indicated, about 875 feet north of the main tunnel No. 1, which may possibly be an extension of the Townlee vein, exposed in cut No. 7 on the east side of Susan Gulch. The cross vein strikes east-west, dips 35 degrees south. The Townlee vein strikes N. 50 degrees E. and dips 75 degrees S.

A parallel vein lies to the west of the Sturgill, about 60 feet away. It is developed by a tunnel, now caved.

The Roy portion of the two veins is developed by several drifts and shafts, now caved.

Over the developed length, the east vein was seen to have a width varying from an inch or so to above 2 feet, but averaging over 7 inches. As the hill to the north of the main tunnel is not very steep (there is possibly 100 feet difference in elevation between the ends of the claim) the amount of backs is not great, and tonnage for any but a

very small mill could not be developed without sinking.

It is probable that the gold is near the zone of secondary enrichment. (The property is several hundred feet lower than the Sanger mine.)

Economics: Assays from the property vary from \$4.00 to over \$50.00. No careful testing of the ore has been made. Since the ore is free milling, the mine presents a favorable aspect for a small operation, probably of not over 25 tons a day and only a few men for operation. Tonnage is not blocked out, and this should be done before a mill is erected, if the testing program is favorable.

Informant: Claude McIntyre through J. E. A.

### SANGER MINE (Gold)

Eagle Creek District

Owner: Wm. Wendt, Baker, Oregon.

"The Sanger mine, formerly the largest producer in the district, is in sec. 2, T. 7 S., R. 43 E., about half a mile east of Goose Creek, just north of the road between Medical Springs and Lily White. The mine has been inactive since about 1900 and was inaccessible at the time of visit. A little surface trenching was going on, as apparently it has been nearly every year since the mine became inactive. Little can be added to the account given by Lindgren summarized below.

"The vicinity of the mine constituted the old placer camp of Hog'em, with a reported production of about \$500,000. The principal vein, the Summit Lode, was discovered in 1870 and actively worked in following years. In 1874, the production was \$60,000 from ore containing \$16 to the ton. The production to 1887 is unknown, though probably small, but a mill was then built, and in 1889 production began to increase rapidly. The Mint reports for the four years 1889-1892 give \$813,000 as the production of the mine. The mine was closed in 1897, but became active again about 1900. Since that time little work other than surface trenching has been done, although probable value of the output is about \$1,500,000.

"The mine is developed by several tunnels and a 400-foot shaft. An old map of the mine seems to show that work was done on two intersecting veins, but no unmistakable evidence of this was obtained.

"The country rock is black slate, somewhat pyritic near the veins, which are gently dipping, well-defined quartz veins with clay selvages. The

gangue was coarse quartz and a little calcite, containing about 3 per cent of sulphides, consisting of pyrite, chalcopryrite, sphalerite, and a little galena, and free gold. The principal vein is reported to have contained three pay shoots. The upper stopes were worked for 600 feet along the vein to a depth of 50 to 100 feet. The average width of the vein in these stopes was 15 inches, and its content \$20 to \$25 to the ton. Below the zone of weathering the vein was 2 to 4 feet wide and carried \$12 to the ton in gold. This relation possibly signified residual enrichment of the vein by leaching out of valueless gangue near the surface."

W. C. Fellows and associates have been, in December, 1938, and January, 1939, opening old workings and conducting a sampling campaign.

Ref. Lindgren, 01:738  
Swartley, 14:120  
Parks & Swartley, 16:198  
Gilluly, Reed & Parks, 33:67 (quoted)  
Lorain, 30:32

#### SHEEP ROCK MINE (Gold)

Eagle Creek District

"Two miles above the mouth of East Eagle Creek in sec. 30, T. 6 S., R. 44 E., is the McGee property commonly known as the Sheep Rock Mine. The rocks in this locality are sandstones and volcanic breccias somewhat tilted. Upon the Sheep Rock claim there is a dike of altered igneous rock 30 to 40 feet wide, which strikes N. 40 degrees W. and dips 50 degrees SW. There is auriferous quartz on both sides of this dike. The veins are from 10 to 18 inches wide and contain from \$1 to \$3 in gold besides carrying some pyrite and chalcopryrite. The principal veins of this property have a strike from N. 30 degrees to 60 degrees E. and a dip of from 27 degrees to 37 degrees NW. These veins have gouge and show slickensides on both walls.

"According to an engineer's report upon this property from which the above statements are taken, some of these latter veins have widths of 20 to 40 inches and values secured by panning of from \$1.40 to \$16.80. Considerable development work has been done in previous years but not much has been done recently."

Not visited.

Ref. Lindgren, 01:739  
Swartley, 14:117  
Parks & Swartley, 16:200 (quoted)

#### SUMMIT MINING CO. (Copper, Gold)

Eagle Creek District

"The Summit Mining Co., of which W. H. Strayer, of Baker, is secretary, controls a group of claims on the west side of East Eagle Creek, about 3 miles above the confluence of that stream with Eagle Creek. A few of the claims extend over the divide west of East Eagle Creek into the drainage of Bradley Gulch, a tributary of Eagle Creek. Originally the claims now controlled by the Summit Mining Co. belonged in two groups—the M. R. Woodard group and the Dunham Miles group.

"A caved tunnel on the Summit claim is reported to have produced \$30,000 at a time when most of the claims were controlled by a Mr. McGee.

"The property is only partly developed. Besides numerous prospect pits, three adits, each between 100 and 200 feet long, were examined.

"The predominant country rock of the vicinity is greenstone, mapped as Triassic by Lindgren and Ross. Some limestone, shale, and conglomerate are present in the greenstone series. The greenstone is gray, brick-red, or dark green. The regional strike may average about N. 10 degrees W., and the dips are uniformly steep to the west.

"The Triassic rocks are cut by much later basic dikes, which may be feeders for the Tertiary basalt blanket that still partly covers the area.

"Midway—The Midway claim of the Woodard group lies on the west side of East Eagle Creek about two-thirds of the way to the divide above the creek. The rock is red shale and greenstone that strikes N. 12 degrees W. and dips 60 degrees W. The vein is exposed in a small prospect pit and may be traced by float for several hundred feet. It is about 6 inches thick, strikes N. 85 degrees E., and dips 50 degrees N. The contacts against the basic dike hanging wall and greenstone foot wall are sharp.

"The vein material is white quartz. Other minerals seen were chalcopryrite, limonite, malachite, and a minute flake of native gold.

"Apex—The Apex claim, belonging in the Miles group, is on the ridge above the Midway claim. There are several prospect pits on the claim, the southernmost of which exposes a quartz vein 1 foot thick, which strikes N. 10 degrees E. and dips 25 degrees E. The footwall appears to be a basic dike similar to that on the Midway claim,

and the hanging wall is dark-green greenstone. Two quartz stringers, 1 inch to 1½ inches thick, run from the vein into the footwall dike, thus indicating that the dike is older than the vein. However, the stringers may not be of the same age as the main vein, as they are not mineralized. The metallic minerals seen in this pit were chalcopyrite and enargite, with chrysocolla and limonite as oxidation products.

"In another pit on the Apex claim, about 200 feet north of the one above described, a series of small quartz stringers, ranging from the thinness of paper to several inches in thickness is exposed.

"*Zenith*—The Zenith claim of the Miles group lies just north of the Apex claim and is opened by a 150-foot adit running N. 65 degrees E. along a 2 to 4-foot quartz vein that dips 20 degrees to 40 degrees NW. Near the face the vein appears to be cut off by a northward-trending fault, which dips steeply east. The fault appears to have the downthrow on the east, and it may be related to a larger fault that is believed to pass through the saddle between the Apex and Zenith claims. The country rock of the Zenith claim is greenstone.

"North of the Zenith claim the ridge is blanketed by a basalt cover that attains a thickness of several hundred feet.

"*Woodrow*—The Woodrow claim of the Miles group is about two-thirds of the way up the west wall of East Eagle Creek valley and about a mile north of the Zenith claim. The claim is developed by a 100-foot adit and a 10-foot incline, both of which follow the vein. One of the basic dikes forms the hanging wall, and greenstone the footwall. The vein strikes north and dips 50 degrees W. Near the south face of the vein disappears, but it was not determined whether this was a result of faulting or whether the vein pinched out.

"The mineralogy is similar to that of the veins already described in this region.

"The dike is well exposed a little to the north of the adit portal and across a small gulch. At this place a quartz stringer, unmineralized, occurs in the dike. The stringer trends N. 75 degrees W. and dips 50 degrees NE.

"*Summit*—The Summit claim lies north of the Woodrow claim. An old adit on this claim was inaccessible at the time of this survey. The portal is in conglomerate and greenstone. The vein material on the dump appears to be the same as that from the Woodrow claim."

Ref. Lindgren, 01:738  
Gilluly, Reed, & Parks, 33:64-66 (quoted)

## GREENHORN AREA

(Located in Baker County)

The Greenhorn District includes the drainage basins of Lightning, Olive and the west fork of Clear Creeks in Grant County. It also has been expanded in Baker County to include all the drainage of Upper Burnt River above a line drawn about halfway between Unity and Whitney. Only those mines in Baker County are treated here.

It is bounded on the south by the Upper Burnt River and Quartzburg Areas, on the west by the Susanville Area, on the north by the Granite Area, and on the east by the Sumpter Area.

Although not rugged, the Greenhorn range, a spur of the Blue mountains, is rather high and somewhat irregular. Vinegar hill, the highest point of the range, is about 8,200 feet. The range extends from near Whitney to a few miles west of Susanville, a total distance of at least 30 miles.

Most of the territory is heavily timbered and only portions of the higher ridges are bare. It is

well watered by many fair-sized, swiftly-flowing creeks on both sides of the range.

The railroad shipping points in the region are Sumpter, Whitney, Tipton and Austin on the Sumpter Valley railway. Roads extend up most of the creeks to the important mines and prospects. Whitney is the only post office in the district.

### Geology:

The entire Greenhorn range is surrounded by post-mineral lava flows. Within this border of lava are greenstones, argillites and lesser amounts of serpentine; and in the heart of the district is found the granodiorite which makes up the backbone of the range and was intruded into the older rocks. The older rocks on the northern side of the ridge and as far south as Greenhorn City, including those of Bonanza, Winterville and Parkerville, are practically all argillites; while the south side of the range as far north as Greenhorn



City is largely greenstone. From the Morning mine to Greenhorn City there are frequent exposures of serpentine. In the large exposure of granodiorite are seen the usual granodiorite porphyry and aplite dikes. Naturally the older surrounding rocks, underneath which is the concealed intrusion, exhibit many of these offshoots from the mass.

After the aplite dikes, the last molten product of the intrusion, came another fracturing of both the intrusion and the older surrounding and covering rocks in which ascending solutions from the interior of the magma filled the veins and altered and replaced the wall rocks. These hot solutions deposited quartz and in many of them both precious and base metals in various mineral forms. Their considerable variety will be noted in the description of some of the mines and prospects. The ores of this mountain range are gold and silver, with copper and lead ores of minor importance. Some of the gold ores are free milling, but usually they are base. Cutting across the middle portion of the range is a belt in which are much silver and antimonial sulphides.

On Clear Creek and within two miles of the main ridge are several silver-gold properties of which the most important mines are the Morris, Bimetallic and Intermountain. In the Ben Harrison the gold and silver values are about equal, while in the others silver is of chief importance.

Mining in the region on the eastern side of the Greenhorn intrusion and in the older rocks into which it came can be placed roughly in two groups. This area is exposed to view because of the erosion of recent basalt, which probably once covered it entirely. The region around the Bonanza mine is in argillite, while these mines in the vicinity of Greenhorn are practically all in the greenstone series. The latter group extends from near the Morning mine through the town of Greenhorn and old Robinsonville to Quartz Creek, two miles north of Greenhorn. There is an exceedingly large number of veins which are usually small but are frequently productive of rich ore.

The creeks which drain into Burnt River have been extensively mined for placer gold. Those of Winterville, Parkerville and McNamee gulch are especially noteworthy.

Only the properties in the district located in Baker County are here described. Those in Grant

County will be described in another bulletin of the Mines Catalog.

#### BANZETTE (Gold)

Greenhorn District

Location: NE. corner sec. 16, T. 10 S., R. 35 E. The Banzette is a little over a mile west of Greenhorn, and is in a soft decomposed serpentinite rock containing vein quartz, a little galena and some chalcopyrite, and some high-grade gold ore.

Vein is in sheared greenstone. Strike generally E., dip N.

Production: No milling and production recorded.

Ref. Parks & Swartley, 16:25  
Hewett, 31:19

#### BELCHER (Gold)

Greenhorn District

(See Golden Gate mine.)

#### BONANZA MINE (Gold)

Greenhorn District

"In sec. 8, T. 10 S., R. 35½ E., and about 4 miles east of Greenhorn and 8 miles by wagon road from Whitney, is the old Bonanza mine, discovered in 1877, and actively operated from 1892 until December, 1904, since which time leasers at different times have mined ore from some of the old workings. The total production was approximately \$1,750,000. From the various levels the property is developed to a depth of 1,250 feet below the outcrop.

"The country rock is argillite, although a little limestone and serpentine are near. The vein strikes about N. 55 degrees W. and is said to be nearly vertical. According to Lindgren, the pay streak averaged only 5 to 6 feet wide, but swelled in places to 40 feet, by the appearance of a vast number of quartz stringers."

Ref. Parks & Swartley, 16:39 (quoted)  
Lindgren, 01:700  
Swartley, 14:188  
Hewett, 31:9-10-36  
Pardee & Hewett, 14:119

#### DIADEM (Gold)

Greenhorn District

Owner: Lee Mantle, Los Angeles, according to S. C. Richardson.

"The Diadem is but a short distance from the Banzette and about 1½ miles west of Greenhorn in the NE. ¼ sec. 17, T. 10 S., R. 35 E. The country rock is greenstone. The vein strikes E.-W. and

has a vertical dip and is of the shattered replacement type. The ore minerals are pyrite and cinnabar. Only a part of the old surface working was visited."<sup>①</sup>

"This mine was not accessible in 1930. Ore minerals are dolomite, galena, and chalcopyrite. No milling or production recorded."<sup>②</sup>

Ref. ①Parks & Swartley, 16:86 (quoted)  
②Hewett, 31:19, 36 (quoted)  
Lindgren, 01:698  
Swartley, 14:185

#### DON JUAN (Gold) Greenhorn District

"This property is about 1 mile southeast of Greenhorn adjoining the Phoenix to the north. It is reported to be in altered greenstone and serpentine with ore vein material of granular dolomite and a little quartz and galena. There is not much activity."<sup>③</sup>

"Tunnel not accessible in 1930. Ore minerals are dolomite, chalcopyrite, and pyrite. Vein in serpentine. No milling records available; small production reported."<sup>④</sup>

Ref. ①Parks & Swartley, 16:87 (quoted)  
②Hewett, 31:20 (quoted)  
Lindgren, 01:696

#### GOLD COIN (Gold) Greenhorn District

Owners are Mrs. T. J. Sheedy, Clarence Merritt, Sue Merritt, and Willis Walk, all of Baker, Oregon. Wm. Boulick is also interested.

Located in 1903 and consists of a group of 4 unpatented lode claims. It is located in a high mountain area. Country rock is argillite, with hanging walls of argillite, and slate foot. Vein strata bears east and west with a width of 4 feet and a length of 3,000 feet. Minerals are gold and silver, which assays at from \$3 to \$10 per ton. Water is ample, power being available from Eastern Oregon Light and Power Company close by. Has blacksmith shop, 1 ore car and track. Developed by 150 feet of tunnels. Mine is now idle.  
Prescott, 6/1/37.

#### GOLDEN EAGLE MINE (Gold) Greenhorn District

Owner: F. R. Klein.

Location: E $\frac{1}{2}$  of sec. 15, T. 10 S., R. 35 E.

Area: 100 acres of patented ground located in 1896 and patented in 1904.

History: This mine is said to have produced altogether about \$75,000. It has been operated since 1928.

Equipment: Car, track, and tools.

Geology: Workings on at least two levels lie in serpentine along large faults trending northwest and southeast. These faults have very smooth and well-defined slickensides. They dip between 50 degrees and 70 degrees to the northeast. The gangue is principally quartz with some dolomite. Sulphide ores are chalcopyrite and galena.

Development: Development and geology are shown on page 117 of Pardee and Hewett, 14:116. There has been no further work of any importance since that time.

Remarks: Mr. Klein is now at work developing the upper level and plans to pump out the lower tunnel.

Informant: F. R. Klein through J. E. A., 38

Ref. Parks and Swartley, 16:105  
Pardee and Hewett, 14:116

#### GOLDEN GATE MINING COMPANY (Gold) Greenhorn District

Local name, Golden Gate Mine, Belcher.

"Office: 145 $\frac{1}{2}$  South Main St., Marion, Ohio. M. F. Douce, Pres., John F. Lust, Treas., both of Marion, Ohio; G. L. Bender, Greenhorn, Oregon, Sec.-Attorney in Fact; Fred L. Daines, Greenhorn, Oregon, Managing Agent. Capital stock, \$1,500,000; par value \$1; \$1,350,000 subscribed, issued and paid up (1914 report)."

"The Golden Gate mine, 2 miles north of Greenhorn, has 3 veins upon the property. The Golden Gate and Belcher veins have nearly all of the development. The Gold Gate vein is some 40 feet in width, most of which is quartz. But little work has been done upon this vein in the last 10 years. Judging from the general appearance of the quartz, and from the fact that little has been done upon it in the last five years, the values are probably low.

"The country rock next to the Belcher vein is in greenstone and greenstone breccia. The greenstone is a fine-grained greenish-colored rock. Its appearance indicates that originally it was an andesite. The breccia is grayish-green in color and the angular fragments an inch or more in diameter consist of dense, almost purplish-colored rock. These fragments are probably trachytic in composition. The matrix is a rather indeterminable mass which seems to consist of a more or less

granular aggregate, now nearly obscured by the alteration products, chlorite and calcite. It has been badly altered by surface weathering and the oxidation is quite deep.

"This vein strikes N.-NE. and dips steeply eastward. The quartz is lenticular, with a maximum width of 3 or 4 feet, diminishing in places to a streak of gouge. There are 2 tunnels upon the vein, the upper some 800 feet long and the lower, together with crosscuts and raises, amounts to some 2,400 feet. The shoots said to contain the best ore are found not very far from the mouth of the lower tunnel. The two shoots are about 225 feet and 60 feet long, with a maximum width of 20 inches. Some distance farther in is a third shoot, with much less quartz and about 200 feet long, with a maximum width of about 3½ feet. A 10-stamp mill was erected in 1914 and began to mill the ore from Belcher vein in February, 1915. It was operated for a time, but without much success."

Ref. Parks & Swartley, 16:106 (quoted)

Pardee and Hewett, 14:114

Lindgren, 01:697

Swartley, 14:187

Hewett, 31:20, 36

#### LISTEN LAKE (Gold)

(Gold Bullion)

Greenhorn District

"Office: Baker, Oregon. F. W. Thomas, president, Fargo, N. D.; C. I. Flynn, secretary, Baker, Oregon. Capital stock, \$500,000; par value \$10; all subscribed, issued and paid up. (1916 report). According to S. C. Richardson, Harvey Jekyll, Portland, is now president.

"This property consists of the Iron Dyke, Copper Dyke, Copper Butte, Copper Sentinel quartz claims and McNamee placers at the head of McNamee gulch, about 4 miles south of Greenhorn and 6 miles north by wagon road from Austin, a station on the Sumpter Valley Railroad. Elevation about 5,000 feet. Located in the southwest ¼ of Sec. 27, T. 10 S., R. 35 E.

"There is a shaft 120 feet deep. The mine lies within an area of altered gabbro (greenstone), which intrudes the argillite series, and the veins bear some resemblance to the "chloritic subtype" of Lindgren, noted in the Iron Dyke (Homestead) deposit. At the Listen Lake mine a silicified shear zone in the gabbro, reported to attain a width of 50 feet, has been crushed and small amounts of pyrite and chalcopryrite have been introduced along fractures. The material on the dump contains a few per cent of copper and is said to contain a

fraction of an ounce of gold to the ton. Water stands within a few feet of the surface in the shafts and the zone of oxidation is shallow."<sup>ⓐ</sup>

"Veins of a type not observed elsewhere in the Sumpter quadrangle are exhibited by these adjoining mines near the west end of McNamee gulch, south of Greenhorn. There is a shaft 120 feet deep on the former and numerous shallow shafts on the latter all of which are now filled with water. A small production is reported from the Listen Lake mine.

"Both mines lie within an area of altered gabbro which intrudes the argillite series, and the veins bear some resemblance to the "chloritic subtype" of Lindgren (01:631), noted in the Iron Dyke deposit. At the Listen Lake mine, a silicified shear zone in the gabbro, reported to attain a width of 50 feet, has been crushed and small amounts of pyrite and chalcopryrite have been introduced along fractures. The material on the dump contains a few per cent of copper and is said to contain a fraction of an ounce of gold to the ton. The material from the Gold Bullion vein is less siliceous and more chloritic, sheared nodules rich in chalcopryrite and pyrite occurring in a dark-green chloritic gouge. Water stands within 10 feet of the surface in the shafts and the zone of oxidation is shallow."<sup>ⓑ</sup>

"Shaft at 60 feet is the development. Vein in sheared gabbro; ore minerals are quartz, pyrite, and chalcopryrite. No milling recorded. Production not recorded."<sup>ⓒ</sup>

Ref. ⓐParks & Swartley, 16:141 (quoted)

ⓑPardee & Hewett, 14:118 (quoted)

ⓒHewett, 31:19, 36 (quoted)

#### MORNING GLORY MINE (Gold, Silver)

Greenhorn District

Owners: M. Knudesen and others, Whitney, Oregon.

The mine is 12 miles northwest of Whitney. Located many years ago, it consists of a group of 5 unpatented lode claims, recorded in Baker county. In a high mountain area; country rock is limestone and slate with hanging walls of slate and lime foot; vein bearing northwest and southeast; width 35 feet. Water is ample; power is developed by gas engine; timber on claims. Mine is being operated with two men employed. Equipped with a shop, two cars and track, a mill building and hand mining tools. Developed by 1,200 feet of tunnels.

Informant: Prescott, 37.

**MUSCATINE (Gold)**  
Greenhorn District

"Development consists of a crosscut tunnel 1,000 feet; drift on vein 120 feet to shaft 200 feet deep. Vein on contact of serpentine and gabbro, striking N., and dipping W. Minerals are dolomite, and pyrite.

"No milling or production are recorded."

Ref. Hewett, 31:19, 36 (quoted)

**PHOENIX (Gold)**  
Greenhorn District

"Development consists of 3 tunnels about 1,500 feet. Vein is in serpentine. Minerals are quartz, and chalcopyrite. No milling recorded. Small production."

Ref. Hewett, 31:20, 36 (quoted)

**PORTERVILLE MINE (Gold, Silver)**  
Greenhorn District

Owner: A. D. Penrod, Baker, Oregon.

The mine is 7 miles from Whitney. Located in 1864 by Pink Parker, and consists of a group of 9 unpatented lode claims. Located in a hilly area; country rock is andesite; vein bearing northeast and southwest; width 3 feet. Has a past production of \$375,000. Water is ample; power is available from Eastern Oregon Light and Power Company, nearby. Mine is now idle. Equipped with a 4-stamp mill. Developed by 600 feet of tunnels and a shaft 175 feet deep.

Informant: Prescott, 37.

**PORTERVILLE PLACER**  
Greenhorn District

Owner: A. D. Penrod, Baker, Oregon.

This mine is 7 miles from Whitney. Mine was located by A. D. Penrod and consists of 25 placer claims recorded in Baker county. Mineral is gold. Located in a flat country. Operated by 5 men.

Informant: Prescott, 37.

**SCHAUB (HENRY) PLACER MINE**  
Greenhorn Area

Owner: M. Knudsen, Whitney, Oregon.

This placer is on Snow Creek 12 miles from Whitney. Located 4 years ago and consists of a group of 9 placer claims. Past production is \$3,000. Equipped with hydraulic giant. Water is ample from Snow Creek.

Informant: Prescott, 37.

**SNOW CREEK MINE (Gold, Silver, Copper, Lead)**  
Greenhorn District

Owners: Hubert S. Smith, Trustee, Bay City, Michigan. Bond and lease to W. A. Fenstermacher and H. Steinhauer, Portland.

Operators: Premium Gold, Inc. (Formerly Snow Creek Mining Co.) Present company—Delaware Corporation. Harold Steinhauer, President, 102 NW. 9th Portland; D. R. Dilley, Director, 1210 S.E. 51st, Portland; K. W. Ehrhardt, Sec.-Treas., Portland; H. D. Gill, Director, Gills Book Store, Portland; R. C. Keeney, Director, Keeney Electric Co., Portland. Capital Stock—\$500,000.00. Par value—\$1.00. 300,000 shares of preferred stock. 200,000 shares of common stock.

Location: In the NW $\frac{1}{4}$  sec. 16, T. 10 S., R. 35 E. About one mile southeast of the town of Greenhorn. Elevation, 6,150 feet.

Area: 15 fractional unpatented lode claims.

History: The mine was operated under bond and lease by the Oregon Consolidated Mining Co. for 5 years, between 1925 and 1930. One shipment of concentrates was made, totalling not over \$3,000 according to M. C. Carson.

Equipment: Ore goes direct to Dodge type crusher (no grizzly), then is lifted up to 30-ton bin, then to Southwestern 35-ton rotary ball mill, driven by an Atlas Imperial 90 h. p. diesel (started by compressor). Pulp to 4 by 4-foot amalgamation table, thence to Dorr classifier, then lifted to 3 by 4-foot amalgamation table. Concentrates to sand pit, whence pumped to 2 flotation cells, followed by Vanner table. Other equipment, an electric D.C. generator, 3 cars, 2,000 feet of track, forge and smithy equipment. Mill building, snowsheds to lower tunnel, etc. Water taken from mine.

The mine is developed by a main crosscut 1,600 feet, the vein is drifted upon for 600 feet. The older workings consist of the upper "Zelda" tunnel, with numerous ramifications, inaccessible. A 200-foot shaft now reaches a level only 9 feet above the lower crosscut. It is drifted upon for 1,000 feet. The vein has been stoped up for 80 feet on the main level, for a length of about 200 feet.

Geological features: The country rock is predominantly argillite, in places quite shaly, the attitude being east-west dipping steeply south. The vein strikes from N. 60 degrees W. to W., and dips from 50 to 75 degrees S. It varies in width from 2 to 10 feet, averaging perhaps 4 feet. The vein consists of large amounts of barren-appearing

quartz, with some areas rich in galena, chalcopyrite, bornite (?), and pyrite. The quartz is much broken and crumbly.

Miscellaneous: Roads are not surfaced, and would not be passable during the winter months after December. The nearest highway is the Central Oregon Highway, about 27 miles to the south. Timber fairly abundant. Water for the mill came from the lower tunnel.

Remarks: The width of the vein suggests that it might be continuous, and a careful study of the workings might lead to picking up the vein again along the strike, in spite of the faulting.

Informant: Prescott, M. C. Carson.

Ref. Swartley, 14:185  
Hewett, 31:36  
Parks & Swartley, 16:208

#### TIMMS GOLD DREDGING CO. Greenhorn District

Local name: Whitney Placer.

"In the southern part of T. 10 S., R. 36 E., and extending almost across it is the Whitney valley

with Burnt River flowing through it. The headwaters of Burnt River rise in the Greenhorn range and many placer diggings such as Winterville and Parkerville are drained by it. The gravels of Whitney valley were prospected by test pits and churn drilling in the fall of 1915 and the spring of 1916. The depth to bedrock was found to be from 7 to 20 feet and some of the test pits are known to be of good grade for dredging purposes, and whether or not there is sufficient acreage of gold-bearing gravels to warrant the installation of a dredge has not been announced."

Ref. Parks & Swartley, 16:237 (quoted)

"The Timms Gold Dredging Co., operating on the Middle Fork of the John Day River near Galena has acquired a large acreage near Whitney, and plans to move operations to that location when the ground at the present location has been worked out. C. H. Timms is manager." (Mining & Contract Review, May 17, 1938.)

### HOMESTEAD AREA

(Homestead and Lower Pine Creek Districts)

#### Geography:

Four miles down the Snake river from Pine Creek and Copperfield is Homestead. Five miles north of Homestead the east and west county line between Baker and Wallowa Counties cuts across the Homestead district. A fair road extends 5 miles down the stream from Homestead. A trail continues along the river 4 or 5 miles farther, and from there on the canyon is impassable. For 125 miles northward, as far as Asotin, a few miles above Lewiston, the Snake river flows through one of the most remarkable canyons in the United States.

The Homestead area includes all the territory between the 117 degree meridian on the west, and the Snake river on the east, and about 15 miles down the river from Homestead.

#### Geology:

The older rocks emerge from below the basalt between Copperfield and Homestead. In the Basin west of Homestead, the contact is a thousand feet or more above the Snake; at Ballards it is about 2,000 feet; at Spring creek, 7 miles from Homestead, a little less; and at Squaw creek, 12 miles away, considerably more.

This ragged edge of the older rocks, elsewhere covered by the red blankets of recent flows, is for the most part made up of greenstones. The greenstone series, the oldest rocks of the district, consist of amygdaloidal, porphyritic, and dense flows with interbedded breccia, tuffs, sandstones, and conglomerates. The igneous flows make up by far the larger part of the series. Smaller streaks of sandstone and conglomerate are imbedded in the flows.

The general direction of the strike is N-S, but the dip varies in both angle and direction. Microscopic examination of many thin sections reveals the fact that the original character of these rocks is much obscured by their pronounced alteration. This much is evident: Before their alteration the flows ranged from ordinary basalt to rhyolite, from basic to acidic, in which are roughly bedded masses of volcanic tuffs, breccias and occasionally thin beds of sandstone and conglomerate. These older rocks in part are old lavas erupted during the Triassic period. They are the same kind of rocks, of the same age and are the production of the same disturbances and rupturing of the earth's crust that caused the outpouring of the streams of molten lavas which are now the greenstones exposed at Cornucopia, at Joseph, on the southern slopes of

the Wallowa range, and doubtless concealed under vastly greater areas by the great outpourings of recent basalt, the Columbia river lavas. The imbedded sandstones and conglomerates show that at intervals this region was submerged to receive for a short time a deposition of coarse and finer sediments, but the lifting out of the water or the coming of the next flow was too soon to permit anything but thin beds of these sediments to be laid down.

Following the last flow much of this as well as a vast region to the north and west was submerged for a considerable length of time, and during this time of submergence limestones in the deeper portions and muddy sediments in the shallower parts were laid down in considerable thicknesses.

About eight miles north of Homestead and continuing for about three miles, limestone lies conformably on the flows and is folded with them. This limestone has a thickness of 300 to 500 feet. It is probable that it at one time covered much of the greenstones in this vicinity. In many places the flows are badly contorted, so much so that the rock has become banded. This folding, which followed the deposition of the limestone and included both it and the series of flows beneath it, was doubtless the result of the same forces which preceded and accompanied the great intrusion of granodiorite that makes up the main body of the Wallowa range. The effects of these movements are not as pronounced here as in much of the regions farther west. It is farther away from the greatest folding and is also farther from the great intrusion which nevertheless came in under this region as well. If the northwest and southeast folding had extended in full effect to this region erosion would have removed lava, limestone, and greenstone here as well and have left exposed the granodiorite. This did not occur, but nevertheless underneath this region there exists the concealed granodiorite intrusion. Numerous dikes of granodiorite-porphry extending upward from the mass below cut the greenstones of Snake river.

Another effect of these movements was the development of a large number of shear zones where often the country rock has been made schistose. The strike of this schistosity is about N-S and it dips usually at a high angle.

The shearing, fissuring, faulting and brecciation of the greenstone gave ample opportunity for lateral and ascending waters to do their work of

alteration and mineralization, the activity of which was much intensified by the after-effects of the deep-seated granodiorite intrusion. In some places the former and in others the latter type of solution appears to have been the chief factor in ore deposition.

The deposition of native copper and the mineralization between greenstone and limestone is probably due to lateral secretion. The quartz veins at Carnahans in all probability are due largely to ascending solutions, while deposition in shear zones, as, for instance, at MacDougal's property and at the Iron Dyke, may be due to a combination of lateral secretion and impregnation from sources below.

After the vein formation there was a period of erosion, after which came the enormous outpourings of basalt. When these had ceased another period of erosion began which, continuing to the present time, has permitted the Snake river to cut its deep channel down even into the older rocks.

#### History:

The discovery of and activity in this district has taken place within the last 40 years. Copper indications at the surface are evident to some degree almost everywhere in the exposed greenstones. Much of this territory is held by location, besides many claims are patented.

#### BALLARD GROUP (Copper) Homestead District, Baker

"These claims are on Ballard creek, about one-half mile west of Snake river from Ballard's landing. The country rock is altered volcanic breccia. The ore minerals are chalcopyrite and its oxidized products, malachite and azurite. Some development work was done upon this group under lease and bond during the season of 1916, but the results have not been announced."

Ref. Swartley, 14:115  
Parks & Swartley, 16:24 (quoted)

#### BROOKLYN GROUP (Copper, Gold, Silver) Homestead District, Wallowa

"These claims, owned by A. P. Carnahan, are situated about 12 miles north of Homestead and about one-half mile from the river, both vertically and horizontally. The location of the camp is a picturesque one, situated as it is in an open space on the edge of a heavy forest, with precipitous rocky walls both above and below.

"These rocks are quite similar to those at MacDougal's. They consist of amygdaloids, breccias

and dense flows cut by grandiorite-porphry dikes. The amygdules are filled chiefly with calcite, although some contain calcite and epidote, and some quartz and epidote. Volcanic breccia resembling Lake Superior rocks have cementing material of calcite with small amounts of associated chlorite. At another point dense greenstones similar to those at the Iron Dyke contain minute grains of iron pyrite.

"A fault type of breccia is made up of fragments of dense greenstones with chalcopryrite and calcite as cementing material. It is a fine-grained porphyry in which there is a very finely interwoven groundmass of altered feldspars with sericite, chlorite, kaolin, quartz and epidote as alteration minerals. Judging from these alteration products, the original was probably an andesite. The chalcopryrite is probably due to impregnation and occurs in the fracture planes and also as scattered grains.

"Considerably altered granodiorite-porphry dikes contain resorbed feldspar crystals, which probably indicates that the parent granodiorite is a considerable distance underneath this greenstone cover. Just how far it may be it is, of course, impossible to say. The presence of this porphyry implies a considerable influence of the granodiorite upon the deposition of ore.

"The series of flows has a N-S strike and a dip 30 degrees west. There are several N-S nearly vertical shear zones. On each side of an E-W granodiorite-porphry dike are quartz veins. There are several other E-W veins. These E-W veins are fissures, while the N-W ones are shear zones of moderate widths, but the mineralization of both types is quite similar. The gangue minerals are chiefly quartz with some calcite and chlorite. Barite is in one of the E-W veins. The ore minerals are gold and silver-bearing chalcopryrite and chalcocite. The latter was found with specularite.

"It seems probable that a large part of the mineralization is due to ascending currents of water from the underlying granodiorite batholith. The leaching of copper from the shattered greenstone played but a minor part.

"Over 400 feet of development work has been done on these claims in crosscuts toward the shear zone and on the E-W quartz veins. None of the several crosscuts have arrived at the shear zone lode and no open cuts have been made upon it to demonstrate its value, although it is undoubtedly worth all such work.

"Because of a misunderstanding as to the nature of the deposit, crosscuts were started instead of tracing the outcrop into a deep gulch, where a drift upon the zone could have been easily started. This drift would have been in material in which at least double the progress could have been made, besides every bit of work would have given information."

Reported that there is now 3,500 feet of development, but property was not visited.

Ref. Swartley, 14:113

Parks & Swartley, 16:44 (quoted)

#### CAP. MILLER CLAIMS (Copper)

Homestead District

This includes a group of six claims located two or three miles below (north of) Homestead on the bluff west of the Snake river. A shaft has been sunk on one of the veins to a depth of about 100 feet. The level at the bottom of the shaft contains the most recent work and exposes a vein of chalcocite, running from one-half inch to a maximum of a foot in thickness with an average of possibly two or three inches. In places, the vein bunches and makes small ore bodies, two or three of which have been mined in the intermediate level above the lower drift. In one of these bunches a quantity of ore was mined which is said to have been shipped and to have returned about three thousand dollars. The walls are greenstone and would be described as "tight".

There is evidence of a substantial thickness of breccia on the west side of the vein in which the shaft was sunk. No opportunity was given to examine the lateral extent of this breccia. At a point near the shaft the breccia was not well mineralized.

Several veins are said to be present on the property, but evidence was not observed from which an opinion could be formed that any of them has sufficient continuity, laterally, to offer an ore zone which could be expected to make a sizable mine. The veins dip almost vertically and trend on the whole in a north-south direction.

Informant: E. K. Nixon, 38.

Ref. Parks & Swartley, 16:51  
Lindgren, 01:751

#### COLE CLAIMS (Copper)

Homestead District

"These claims are located in a branch gulch less than a half mile west of the river from Ballard's landing in sec 10, T. 6 S., R. 48 E. The

country rock is an altered volcanic breccia containing some chalcopyrite. The chalcopyrite is in fair-sized grains and in minute reticulate veins. Much secondary quartz and chlorite are present. A vein about 1 foot wide is being followed with the expectation, after some further work, of reaching one of much greater width, which is said to outcrop upon the hill."

Ref. Swartley, 14:115  
Parks & Swartley, 16:57 (quoted)

#### DUCK CREEK PLACERS

Homestead District

Owner: John T. Hendrix, Mrs. J. T. Hendrix, and Frieda Hendrix, Halfway, Oregon.

Location: 8 miles northwest of Homestead, along the entire length of Duck Creek.

Area: 17 unpatented placer claims, totaling 340 acres.

Miscellaneous: Property could be worked from May 1 to December 1 at least. Water is said to furnish about 150 miners' inches. A ditch  $\frac{1}{4}$  mile long at the lower end of the property gives an 8-foot fall.

Geology: Elevation about 4,000 feet. Both gulch (lower) and flat (upper) operation. Bedrock rotten granite. Gravel in flat less than 1 foot in diameter. In the gulch a few larger boulders occur up to 8 or 10 feet in diameter. Near the bottom the gravel apparently is finer grading into a cement gravel and talc. The gravel is from 8 to 14 feet deep, but the bottom in the meadow has not been tested. There are no clay layers seen. Gold is coarse and flat or rounded, lying scattered throughout the gravel. It is finer near the surface. The gold is 878 $\frac{1}{2}$  fine. This property was not visited.

Informant: John T. Hendrix through J. E. A.  
Dated November 23, 1938.

#### ELLIOTT MINE (Gold, Copper, Silver)

Homestead District

Owner: Jess Elliott, Baker, Oregon.

The Elliott mine is 9 miles from shipping point, Robinette, on a branch of the Union Pacific. Mine was located two years ago and consists of one unpatented lode claim. Located in a high mountain area, the country rock is andesite and greenstone; vein bearing northeast and southwest; width 12 feet. Water is ample, power is available from Idaho Power Company; timber on claims. Mine is developed by 400 feet of tunnels; no equipment reported.

Informant: Prescott.

#### FARRELL GROUP (Copper)

Homestead District

"L. D. Lilley and associates, of Baker, Oregon, secured a bond and lease upon this property, which was formerly owned by Ed Farrell. It was sold to eastern people who worked the property for several years and who finally failed to do the annual assessment work. The property was relocated by J. W. Beckman.

"This group is situated south of the Iron Dyke and is thought to be upon an extension of the Iron Dyke ledge. The property had a 400-foot crosscut, and Mr. Lilley was engaged in continuing this tunnel to crosscut the ledge shown upon the surface and in the shallow workings above."

Ref. Parks and Swartley, 16:93 (quoted)

#### HILL CLAIMS (Copper)

Homestead District

"South of the MacDougall group, in secs. 1 and 2, T. 6 S., R. 48 E., are a number of claims on which there is a variety of rocks belonging to the greenstone series. One of them, although locally called 'monzonite', undoubtedly is greenstone. Its exact original character was not determined. Although considerable work has been done in this rock, the more favorable parts of this group are those places where the conditions are similar to the MacDougall and Ballard claims, which see for description."

Ref. Swartley, 14:115  
Parks & Swartley, 16:124 (quoted)

#### IRON DYKE COPPER COMPANY (Copper, Gold)

Homestead District

Local name: Iron Dyke mine.

"Office: Erie, Penn. F. F. Curtze, Pres.; F. A. Brevelier, Sec.; A. A. Claus, Treas., all of Erie, Penn.; A. G. Miles, Homestead, Oregon, attorney-in-fact. Capital stock, \$500,000; par value \$1.00; \$380,000 subscribed, issued and paid up. (1915 report.)

"Erie Trust Company holds title by trust deed and bond. Worked by Homestead-Iron Dyke Mines Company.

"This copper deposit, discovered in 1897, is situated about 2,000 feet from the railroad at Homestead. The lower tunnel is about 300 feet above the town. The main croppings are about 375 feet above the lower tunnel and 70 feet below the croppings is the upper tunnel. Down 50 feet farther is an intermediate crosscut, and midway between



the latter and the lower tunnel is a fourth cross-cut.

"The lower tunnel is in some 1,300 feet, cutting the ore body about 800 feet in and passing through it, continues on without discoveries. A zigzag raise connects this tunnel with the three tunnels above. Unfortunately this raise was started a hundred feet beyond the ore in the lower tunnel, and much other development could have been placed to better advantage. The opportunity here to block out the ore and to determine its limits was excellent.

"The series of trachytic or perhaps rhyolitic flows here have been so badly altered and silicified that they are now a chloritic indefinite greenstone. Intercalated with the flows is a body of dark brown altered andesite, which may have been an intruded sill.

"The greenstone in the hand specimen is in color light green and quite dense. Under the microscope thin sections vary from very fine grained to a ground mass of abundant sericite with some chlorite and a few crystals of secondary quartz. Minute faulted quartz veinlets are revealed throughout this altered greenstone. No thin sections were made of the meta-andesite to determine exactly its present character.

"Although the character of some of these flows, due to a variation in their composition and structure, might be much more favorable to concentration than other flows, nevertheless the factor of most importance here is the opportunity for ore concentration through fault planes and shear-zones.

"A considerable amount of shearing and faulting has taken place in this immediate vicinity. Several pronounced slips were noted, all having a strike of N. 20 degrees E., and dipping at rather high angles eastward. For a considerable width a shear zone, many feet wide, has the same general direction. The best ore in the lower tunnel is massive chalcopryrite and pyrite, with but little quartz, as a gangue in a lens-shaped body dipping 60 degrees E., with a maximum width of about 6 feet, which is said to extend from the lower to the upper tunnel.

"On the west side of the lens in a short crosscut from the lower level the ore seems to be cut off rather sharply by a fault. On either side of this high grade ore, which is said to average 15 to 20 per cent copper, is a much larger body of dissemi-

nated pyrite and chalcopryrite in the chloritic greenstone, in which are abundant quartz seams, veinlets and nodules that contain pyrite. There is often a silification of the rock itself. Statements are made that it contains about \$2 in gold, and 6 to 30 ounces in silver, regardless of the per cent of copper present. This deposit, both high and low grade, is in a zone of crushing in which copper-bearing solutions have deposited their contents largely by replacement.

"This series of rocks has suffered severely and has become badly altered. This, of course, creates the best conditions for the concentration of metallic minerals whenever opportunity offers, whether it be in great or small fractures, shear zones or in amygdules. In this particular property a study of thin sections has shown the formation of minute veins which were afterward broken. The field evidence clearly shows the faulting and shearing that have taken place. All of these conditions are favorable to the deposition of copper minerals that have been dissolved from the greenstone series, which practically always contain some copper.

"However, as noted before, the presence of such an amount of highly silicified rock and the fact that the gold and silver values are considerable and independent of the copper content, seems to indicate an impregnation of this shear zone from sources connected with the granodiorite. The gold and silver and possibly some of the copper impregnated the shear zone, which at a later time, having been resheared, has permitted a reconcentration of copper from the shear zone along principal planes, assisted by a deposition of copper brought in from the greenstone walls, from which it had been dissolved by circulating waters of moderate depth and temperature.

"For the year ending August 28, 1916, 462 fifty-ton cars of copper ore were shipped, which is said to have averaged more than 6 per cent net copper, besides about \$5 in gold and silver per ton. The average shipments of crude ore for the year 1916 have so far been at least 2,500 tons monthly.

"Commodious and comfortable bunk and boarding houses have been erected, as well as several bungalows for officials and others. A concentrating plant has been erected and started operation about September 25, 1916. This mill has a guaranteed capacity of 125 tons and probably averages at least 150 tons daily. The mill feed, which consists of the ore too low grade to ship crude, goes

from the crusher to a ball mill, which reduces it to 60 mesh and concentration is effected by flotation and extraction of 90 per cent. The mine is located about 4½ miles from the Oxbow hydroelectric plant and a high line was constructed in 1916 to the mine. Previous to this time the compressor was driven by steam power with coal as fuel. The mine and mill are now operated by electric power. It is said that the shipment of crude ore will be continued, to which the operation of the mill has added a considerable daily tonnage of concentrates."

Since the above was written the mine and mill were operated for some years. The mine was developed by shaft to levels below the lower crosscut. On the lowest level the ore body was cut off by a nearly horizontal fault. The ore body here was egg-shaped, about 140 feet wide and 210 feet long, carrying good grades of copper and about ¼ ounce in gold. The mine finally was shut down. A few years later the property came into possession of the Idaho Copper Co. which was developing the Red Ledge across the Snake river about 12 miles north of Homestead. This company operated the mine and mill for a period but closed it. The Idaho Copper Co. was in litigation for some years thereafter. Considerable core drilling was done to locate the ore body below the fault.

Press reports early in 1938 stated that the property was owned or controlled by Cooley Butler, 745 Rowan Bldg., Los Angeles, California, and that a 10-foot by 10-foot crosscut was being driven to cut the workings 500 feet below the collar of the shaft. This crosscut would be 1,400 feet long and was in 400 feet March 1, 1938. No reports since then. The mill has been dismantled. The railroad between Robinette and Homestead has been abandoned and the grade is now used as a highway requiring hauling of ores, concentrates and supplies to and from that point.

Ref. Lindgren, 01:749  
Swartley, 14:107  
Parks & Swartley, 16:124, 130 (quoted)

#### KOGER GROUP (Copper)

Homestead District

(Snake River Mining and Milling Co.)

"Office: R. D. No. 2, Box 218A, Pasadena, California. J. H. Schneider, Pres.-Treas.; Mrs. J. H. Schneider, Sec. Capital stock \$300,000; par value \$1.00; \$219,105 subscribed, issued and paid up. (1916 report.)

"This company has many claims located in the basin northwest of the Iron Dike, about 1 mile from Homestead, in secs. 8, 9, 16, and 17, T. 6 S., R. 40 E. The same types of dense greenstones are found here, which have scattered through them small amounts of pyrite. In contrast with the Iron Dike, this property has but a slight amount of faulting and no shearing."

Ref. Swartley, 14:115  
Parks & Swartley, 16:208 (quoted)

#### MacDOUGALL GROUP (Copper)

Homestead District, Baker and Wallowa Counties

"Nineteen of the 40 claims owned by W. B. MacDougall are patented claims. They are located about 5 miles north of Homestead, ½ mile to a mile from the river and up to 2,500 feet above it. The region consists of a greenstone series, which is made up of altered dense porphyritic and amygdaloidal flows with interbedded breccias and tuffs and possibly some intercalated sheets and sills. Considerable shattering has taken place; in fact, the principal mineralization is in brecciation zones. The observed porphyritic and amygdaloidal flows are andesite, while the breccia is made up of the angular fragments of various types of lavas held in a dense groundmass of ferruginous material, in which there has been quite a development of secondary calcite.

"The different types under the microscope show that these greenstones have been extensively shattered with the subsequent development of calcite, epidote and quartz in gash veins. Some of these veins contain small amounts of pyrite and chalcopryrite. Occurring in this way, it indicates that these materials are the result of lateral secretion processes.

"The principal mineralization is in brecciated steep-dipping N-S shear zones. Three of these zones were observed and there are said to be four others beyond. Although no surface crosscuts have been made to determine the width, they are said to be from 30 to 200 or more feet wide.

"In these shear zones occur various sized stringers of quartz, calcite and chalcopryrite. In some places stringers of chalcocite more than an inch wide are found. These stringers of chalcocite are intimately mixed with a lesser amount of quartz. In some places the country rock on each side of the stringers is impregnated with chalcocite for several inches. At the immediate surface the chalcocite is partially altered to malachite with some

azurite, but even there the alteration is quite incomplete and three or four feet below the green and blue colorings of the copper carbonates are nearly absent.

"A very important undetermined question is the primary or secondary nature of the chalcocite. If it is primary the same type and degree of mineralization might well be expected to continue far downward in the sheared zones. If it is secondary the chalcocite at shallow depths would cease and much smaller percentages of copper in chalcopyrite mingled with pyrite would be found as the primary ore below the shallow secondary chalcocite.

"Some of the chalcocite, as before stated, is intimately mixed with quartz and is apparently a primary mineral. On the other hand, on the surface of one of the upper zones a boulder was broken open, which contained crystals of chalcopyrite, which are being replaced by chalcocite. This boulder has been shattered somewhat and contains chalcopyrite as scattered grains and also associated with quartz and epidote. Some of these grains have been altered to malachite.

"In from the portal of the lowest crosscut tunnel 500 feet, but said to be 300 feet away from the first shear zone, is found a rock with a few amygdules filled with calcite and a small amount of chlorite along their borders. This rock is cut by numerous calcite veinlets, some of these containing chlorite and a small amount of chalcopyrite. The calcite in the amygdules is pink, while that in the gash is white.

"The fracturing came later than the filling of the amygdules, since these veins cut the latter without faulting. In this rock the small amount of chalcopyrite is primary. The chalcopyrite in the boulder mentioned above is primary, but the sooty chalcocite there replacing it is secondary.

"When the lower tunnel reaches the shear zones several hundred feet below their outcrops, will it find primary chalcopyrite or primary chalcocite? The evidence would lead one to hope that chalcocite will be found.

"The shear zones were probably created at about the same time as the vein forming period elsewhere in eastern Oregon. This was probably after the lateral secretion processes had largely completed their widespread alteration and deposition, as evidenced in the lower 500-foot tunnel. The quartz and chalcocite in these shear zones are

apt to be the product of ascending thermal solutions. If this be the case, the chalcocite, in conformity with its appearance and its intimate association with quartz, is probably primary and, therefore, will be the copper mineral to be found at depth within the shear zones.

"These claims cover steep to gently rolling hills in which at various points there are many open cuts and pits, numerous short tunnels and three long ones, approximately 200, 300 and 500 feet, respectively. The open cuts have in nearly every case disclosed copper in stringers which have been followed. No open cuts cross the shear zones at points most favorable to expose possible wide disseminations. These could have been made quite cheaply and would have exhibited the width of the shearing, whether the fractures are closely spaced or too widely separated, and whether there might be at some points ore sufficiently rich to ship. After the open crosscuts have been made conclusions could be drawn as to whether the chalcocite is sufficiently disseminated to make low grade ore throughout, or whether is higher grade but more limited bodies of ore.

"If favorable results were secured by the crosscuts, keystone or diamond drilling could be first done at the most favorable points which, if promising could be followed by systematic arrangement of the drill holes so as to determine the limits of the ore bodies. Should wide zones of low grade primary chalcocite be disclosed, its proximity to the railroad, to water and water power, the favorable climate, and absence of overburden or leached zone requiring stripping, would permit as low grade of ore to be profitably mined as at any of the porphyry coppers now successfully operated.

"In 1916 several engineers visited this property to determine whether they should recommend it to their principals for development, but up to late in the year none of them have had the courage to make such recommendations without the nature and value of the deposit having been proven at depth.

"In addition to the deposits of copper glance upon this property, there are native copper-bearing outcrops. All of these native copper outcrops are in a certain type of Triassic lavas by the general name greenstone, which in the nature of the rock and in the occurrence of the copper in the rock, are essentially like that of the amygdaloidal copper ores of northern Michigan. It is almost impossible

to sample the croppings which involve a few acres, so that a statement can be made as to its assay value, but after examining several hundred pieces broken with sledges on the surface, followed by an assay of many representative pieces and sacks of samples, it is thought that it will exceed 1 per cent of copper in value. This outcrop has no underground development."

Taken from the Eastern Oregon News, Oct. 21, 1938:

"The Crown Copper Company, of which Howard H. Newell of Toledo, Ohio, is president and general manager, has taken over the group of 42 mining claims, 19 of which are patented, known as the MacDougall claims, three miles north of Homestead on the Oregon side of the Snake river.

"Mr. Newell recently completed the purchase of the property in the interest of his company. He has been in Baker during the week purchasing supplies and equipment and arranging for starting development work planned.

"It is the intention to drive a 900-foot tunnel and this work will be started as soon as proper equipment is installed. Clayton Robbins, well known mining engineer and metallurgist, who has been in the Homestead district a number of years and is thoroughly familiar with the MacDougall property, will be in charge of the work, Mr. Newell stated.

"The MacDougall property was developed by hundreds of feet of tunnels by the late John MacDougall. The property has been idle since his death several years ago. The mine has been noted for the rich copper ore exhibited at some of the world expositions, and has long been known as one of the better properties of its district.

"Mr. Newell has been a frequent visitor in Baker the past couple of years during which time he was investigating the property, and now that the

purchase has been completed and the mine paid for he expects to make his home at the mine and will be a frequent visitor in Baker."

Ref. Swartley, 14:109  
Parks & Swartley 16:146 (quoted)

#### McCARTHY CLAIMS (Copper) Homestead District

"The McCarthy property, situated about 1 mile north from Homestead, in sec. 16, T. 6 S., R. 48 E., has chalcopyrite in a vein a few feet wide, but work has been interfered with by a basalt dike, which has discouraged development."

Ref. Swartley, 14:115  
Parks & Swartley, 16:152 (quoted)

#### NUGGET CORPORATION OF OREGON (Placer) Homestead District

Sidney C. Love, Pres.; A. A. Smith, Secy., Baker, Oregon. Capitalization, \$50,000. Nugget Consolidated Placer consisting of about 140 acres on the Snake river in Baker county. Development work only.

#### ROGERS GROUP (Copper) Homestead District

"This group, upon which considerable development was in progress in 1916, is situated about 3 miles below Homestead and in close proximity to the river and about 1,000 feet above it at the outcrop. The outcrop is easily observed, since it is decidedly red in color and several feet wide. The development consists in driving crosscuts a few hundred feet to determine the nature of the deposit which has such a pronounced gossan.

"It was feared that the tunnel, which was being driven at the time the property was visited in August, 1916, would crosscut the deposit too high above the water table to determine whether or not commercial copper ore would be found at depth."

Ref. Parks & Swartley, 16:195 (quoted)

### LOWER BURNT RIVER AREA

(Weatherby, Gold Hill, Chicken Creek, Pleasant Valley Districts)

#### Geography:

The Lower Burnt River Area includes the drainage of Burnt river from Cave and Deer creeks south to the Snake river, with the exception of upper Dixie creek, where the old Rye Valley district, now grouped with the Mormon Basin district, is located. Burnt river emerges into an open valley

near Durkee, turning at the same time to a southeasterly direction, which it maintains until near its junction with the Snake. A few miles below Durkee a canyon, with a depth of from 2,000 to 2,500 feet, again begins and continues down to Huntington. Above Weatherby a number of smaller tributaries join the river, all heading up toward

Lookout mountain (elevation 6,900 feet), the highest point in the divide between Burnt and Powder rivers and a well known landmark visible from all directions. The elevation of the river at Durkee is about 2,650 feet, descending to 2,117 at Huntington. The grass-covered slopes rise steeply from the narrow flats along the river, and are forested only along the highest portions of the Lookout ridge. During the rainy season Burnt river carries a considerable amount of water, but so much is taken out in ditches for mining and agricultural purposes that it is almost dry at times during August and September near Huntington. Dixie creek, heading some 12 miles westward on Pedro mountain, is the only tributary of note entering Burnt river from the western side.

### Geology:

Burnt river canyon, in the region here described, is cut in older rocks—slates, limestones and diorites. The great sedimentary series is, as far as can be seen, conformable with the Huntington and Snake river series. It consists almost exclusively of fissile clay-slates and strata or lenses of gray limestone. It is only toward Unity and Pleasant Valley that greenstones and greenstone tuffs appear, probably as formerly intercalated flows. The strike is very constantly N. 70 to 80 degrees E., and the dip usually at very steep angles toward the north. The most prominent stratum of limestone crosses Cave creek south of Burnt River canyon, and continues with well marked croppings several hundred feet wide to the foothills of Durkee valley. The age of this series is not known, no fossils of any kind having been found in the limestone masses or in the slates. Occasionally greenstone-schists are interbedded with the clay-slates.

Large masses of granitic rocks are intruded into this sedimentary series on a line from Lookout mountain to Malheur, a line also followed by the gold deposits. The most easterly of these masses occupies Lookout mountain, and the summit of the ridge. A smaller area of granodiorite begins on Gold Hill, a few miles southeast of Durkee, and probably continues down as far as Sisley creek. The third and largest area contains quartz-diorite and diorite along the margins, but granodiorite and possibly also granite in the center. This is the area of Pedro mountain on the west side of Burnt river, extended for about 10 miles southwest and

northeast, with a maximum breadth of 6 miles. The intrusive character of these rocks is proved by dikes of similar material in the slates and by contact metamorphism of the latter. As far as observed, these granitic rocks show no schistosity.

The Neocene formations are developed extensively only in Durkee valley and in the foothills 5 or 6 miles north and northeast of the railroad station.

Auriferous veins and placers accompany the series of intrusive granitic rocks from Lookout mountain to Malheur. In contrast to the strongly-developed vein system of the Sumpter region, these veins are not very persistent. They cannot be traced for long distances, nor are strike and dip constant. On the whole, this belt is more noted for its placers than for veins, from which fact it might be inferred that the gold is scattered in many small fissures rather than concentrated in prominent vein system.

Several prospects are located north of Lookout mountain, but they have not as yet attained prominence. On Chicken creek, near Weatherby, are several veins which have been worked in a small way for many years. Practically all of the streams which flow into Burnt river are gold-bearing and have been worked since the early days. A few placers are now worked each year. The most celebrated are the diggings of Sisley and Chicken creeks. The gravel bed of Burnt river is gold-bearing and low bars have been worked with considerable success below Durkee.

Between Durkee and the mouth of the lower canyon good dredging ground is thought to exist. At Weatherby the canyon widens to 700 feet. A dredge was operated for a short time about 20 years ago, but it ceased operations because it was not heavy enough to do the work.

### BIG LODE MINE (Gold) (Hannibal Mining & Milling Co.) Lower Burnt River Area

“Office: Baker, Oregon. J. H. Waugh, Pres.; G. S. Misener, Treas., both of Vancouver, B. C.; M. N. Thompson, Sec., Baker, Oregon. Capital stock \$96,000; par value \$1.00; subscribed \$96,000; none issued or paid up. (1913 report.)

“Located 2 miles northeast of Weatherby, a station on O.-W. R. & N. Co. line, on Chicken creek, a tributary of Burnt River. Lands, 4 quartz claims. Have not been visited, but secretary reported in

1914 that about \$20,000 had been expended upon the property. He describes the recent work as 'a crosscut tunnel 600 feet tapping the contact, at a depth of 200 feet from surface. We are driving on the contact and it is proving to be a very large body of ore and mineral matter. In this body we find several different ores, some having tested from \$3 as high as \$40 in gold.' In 1915 and 1916 assessment work is about all that has been done.

"Dissolved by proclamation in January, 1917."  
Ref. Parks & Swartley, 16:116 (quoted)

**BONNIE CLAIM (Tungsten)**  
Lower Burnt River Area

"Owner: A. V. Lovejoy, Lime, Oregon."

"Located 4½ miles from Weatherby. Recently located. Country rock is lime and shale; vein bearing southwest and northeast; width 2 feet and 3 feet. Metal is scheelite. No tests nor assays have been made, although prospecting has been done on the claim."

Ref. Prescott, 6/1/37. (quoted)

**DURKEE DEVELOPMENT CO. (Gold)**  
Lower Burnt River Area

"The Durkee Development Co.'s property is half a mile southeast of the Rye Valley road at an altitude of about 4,000 feet and is about 5 miles by road from Durkee. It is under the management of C. L. Deerdorf and is owned by Deerdorf & Graves, of Durkee. Development work was going forward at the time of visit.

"The vein seems to be associated with a diorite porphyry dike, but exposures are too inadequate to demonstrate this relation. Some arkose in the slate series was observed on the hillside to the east of the veins. One shaft about 30 feet deep has been sunk but was caved at the time of visit. A short crosscut driven below to connect with this shaft penetrates slate and a basaltic dike.

"The vein is composed of quartz and strikes north and dips about 45 degrees W. Pieces of vein material about a foot in diameter are present on the surface, but the greatest thickness exposed in any of the workings is 8 to 10 inches. Nothing is known of the assay value of this quartz."

1938, workings caved.

Ref. Gilluly, Reed & Park, 33:56 (quoted)

**DURKEE GOLD RIDGE MINING CO. (Gold)**  
Lower Burnt River Area

Oregon corporation, J. E. Rogers, Pres., Durkee, Oregon; John Finne, Secy., 6028 SE. Lafayette

Street, Portland. Capitalization, \$100,000. Ten quartz mining claims located about six miles south of Durkee in sec. 9, T. 12 S., R. 43 E.; assessment work only; considering mill construction.

Located about 1880; 10-stamp mill and other buildings burned; shaft 250 feet deep; 2,000 feet of drifts and crosscuts.

Country rock quartz diorite; 3 veins, strike N. 51 degrees W., dip 65 degrees SW.

Ref. Parks & Swartley, 16:109  
Lindgren, 0:765  
Gilluly, Reed & Park, 33:56

**FULLER AND INGERSON CLAIMS (Gold)**  
Lower Burnt River Area

Owners: Al Fuller and George Ingerson, Durkee, Oregon.

Location: Little Lookout Mountain—secs. 17, 20 and 21, T. 10 S., R. 44 E.

Area: Deeded property—2,000 acres.

Old tunnel reputedly blown in by owner who had discovered good vein with fair values. Cleaned out and reopened by Fuller and Ingerson.

Development: 180 feet crosscut, cutting vein at breast.

General conditions: Located above timberline at an elevation of about 6,000 feet. Situated near the headwaters of Durkee Creek where there is a small spring flowing all year around. The snow fall is usually heavy. A good truck can negotiate the road to the property. There is no equipment on ground; no power within 10 or 12 miles.

Geological notes: Country rock is mainly granodiorite capped with Columbia River basalt, although locally the granodiorite seems to have form of a dike. At one point the granodiorite contained nodular inclusions of what seemed to a basaltic phase of the diorite.

Vein deposit: This has a width of 30 feet, 11 of which consists of hard, dense, bluish-black quartz assaying .11 ounce gold and .5 ounce silver. The remaining 19 feet of the deposit is of brecciated quartz stringers separated by gangy, granitic material, with an average assay value of \$1 in gold and silver. The strike of the body is N. 20 degrees W. and the dip 55 degrees to the SW. Heavily silicified material of basaltic nature forms the hanging wall. Apparently the vein cannot be traced through the ridge on account of the lava capping, but it is reported to be present on the southeast side of the ridge.

The ore is free milling and contains no sulphides of consequence. With \$4 ore exposed for 11 feet and much leaner for the remainder of the thickness, it plainly is too low grade to ship. If a substantial tonnage of the \$4 ore were found, it would have to be hauled 3 or 4 miles to suitable millsite location with plenty of water. Ore at present is not sufficiently outlined to permit tonnage estimate. Stopping depth at present not more than 100 feet or 150 feet on account of lava capping.

Recommended short drift in soft material along footwall with crosscut in vein to see if values are continuous.

Ref. A. V. Q., 1937.

#### GIBBS PROPERTY (Gold) Lower Burnt River Area

"Located about 4 miles northeast of Weatherby in about sec. 9, T. 12 S., R. 44 E. Country is hilly and for the most part barren, although timber is at no great distance to the northeast.

"The geology of this immediate vicinity presents a contact between granodiorite and black argillite. The mineralization occurs in what might well be termed contact veins, consisting of irregular lenticular masses of quartz varying from a few inches to a foot in width at the contact of the granite rock and the argillite. The quartz is now in a crushed condition due perhaps to later movement. Some of these masses are said to go as high as \$300 per ton. Their mode of occurrence makes the blocking out of the ore costly."

Ref. Parks & Swartley, 16:99 (quoted)

#### GLEASON MINE (Gold) Lower Burnt River Area

Owner and operator: A. V. Lovejoy and Mrs. Dora Rizer, Lime, Oregon.

Location: N. ½ sec. 15, T. 12 S., R. 44 E., W. M. About 5½ miles from the shipping point Weatherby, on the railroad and highway No. 30. Elevation about 4,500 feet.

Area: Seven unpatented lode claims.

History: Located about 1867 by Fred Gardner and John McGilvery and has been operated intermittently since. "Northwest Mining" for April, 1935, says: "The old Gleason mine at Chicken Creek, Oregon, has been sold by the Lovejoy family to the Waugh Brothers of Auburn, Washington, and G. M. Hubbard of Seattle, who are pushing a development campaign in charge of James Brown of Baker. A 200-foot shaft is being

started." At the present time the mine is being operated by A. V. Lovejoy. Past production is said to be \$150,000.

Equipment: The 5-stamp mill has alternative power in a model T Ford truck (rear wheel drive by belt) and a 10 h. p. horizontal steam engine with a 14 h. p. boiler. The latter has not been in use recently due to scarcity of wood for fuel. The pulp from the mill passes through a 40 mesh screen and over silvered copper plates 4 by 10 feet. It then goes to a 6 by 14-foot vanner table, whose concentrates are returned to the mill heads. In the mine two small gasoline engines serve the windlass and the 100-foot winze. Cars and 600 feet of track. Production about 7 tons per day.

Geology: The mine lies in hilly country at about 4,500 feet elevation. The country rock is biotite granodiorite with a "porphyry dike" hanging wall. The main vein strikes N. 7 degrees E. and dips about 65 degrees W. It is well defined with a width varying from 2 to 4 feet. The ore is similar to the other mines in the district, being free milling gold in a sheared quartz. No sulphide was seen. Ore is said to run \$30 to \$70 per ton.

Development: The mine was first developed by a 200-foot tunnel running due east into the hill from just above the mill. This was called the Blacksmiths tunnel. The present work is done through a new tunnel a little less than 1,000 feet south and 80 feet lower. This tunnel starts N. 20 degrees W. and continues in that general direction (with numerous bends) for 550 feet where it intersects the vein. The vein has been drifted and stoped to the surface over about 300 feet distance, the north drift connecting to the end of the Blacksmith tunnel with an 80-foot raise. The inclined winze has been sunk to a depth of 100 feet and has been drifted at the 40-foot level for 150 feet to the south and 200 feet to the north and on the 100-foot level for 200 feet to the south. Total about 2,000 feet of workings.

Informant: L. Gifford and records of J. Prescott. June 15, 1938 (J. E. A.).

Ref. Parks and Swartley, 16:99  
Lorain, 38:35

#### GOLD CLUSTER GROUP (Gold) Lower Burnt River Area

Owners: M. P. Gifford and John E. Johnson, Route 1, Huntington.

Location: Elevation 4,500 feet. Sections 21 and 22, T. 12 S., R. 44 E. W. M. About 4½ miles from the highway and railroad at Weatherby.

Area: 10 unpatented lode claims in one group and two in another  $\frac{1}{4}$  mile west.

History: The "Knight" tunnel, 161 feet below the Sam McGee No. 1 tunnel, was operated 40 years ago. Gifford located present claims in 1928, and has done all the rest of the work since that time. In the last 3 years about 200 tons have been produced, averaging about \$40 per ton, or a total of perhaps \$8,000 since 1928.

Equipment: The operation is by two men, and there is no equipment beyond wheelbarrows, drills, etc., and a Model T Ford truck, by which the ore is taken to mill. The ore is taken to the Little Hill 2-stamp mill, which is operated by the same truck. Passed through 40 mesh screen and over 3-foot and 7-foot copper plates, silvered.

Geology: The country rock is biotite granodiorite, cut by several vein systems striking north and dipping about 35 degrees to the west. In the Sam McGee tunnel the vein is offset to the east by numerous small step faults, which cause the trend of the tunnel to take a N. 35 degree E. to N. 65 degree E. direction, while the true strike is about N. 7 degrees E. for the vein. The vein averages 3 inches wide, but in places is said to be as much as 16 inches. It is composed predominantly of either white sugar quartz or white layered quartz. The layering seems to be the result of movement rather than primary. There is only a small amount of limonite stain. Clay gouge is present, also suggesting a large amount of postmineral movement. Miners in the district refer to a basaltic "blow-out" which caused the vein system. This basalt, however, is Tertiary (Miocene) basalt and post-mineral. If it is a feeder plug and not just a capping, it may have helped cause the later step faulting. The ore is free milling. There are almost no concentrates when passed over vanner tables. Gold appears as wires and nuggets in the clean white quartz and is said to be 770 to 825 fine.

Conditions affecting mining: There is no water available at the present time, although several old ditches, previously used for Chicken Creek placers, cut across above the property. Timber must be hauled a distance of about 4 miles. There is only about 12 inches of snow, and work can go on all year. The road is open most of the year.

Development: There is over 600 feet of tunnel on the property as follows:

Knight Tunnel: 200 feet with 100-foot branches. Stopped 80 feet to surface, about 60 feet wide.

Sam McGee: Two upper levels, 100 feet each. Lower level 250 feet, stopped to surface.

Shepherd: 3 tunnels: 80 feet, 80 feet, and 30 feet. Shaft 25 feet.

Gold Cluster: Shaft 20 feet.

Lone Juniper: Tunnel 130 feet.

There are numerous other shallow pits exposing small stringers. The old placer workings up the numerous gulches have led to several veins which have been opened but not developed.

Informant: M. P. Gifford, June 15, 1938 (J. E. A.).

### GOLD HILL MINE (Gold)

#### Lower Burnt River Area

"The Gold Hill mine is in the SW $\frac{1}{4}$  sec. 1, T. 12 S., R. 43 E., on the north side of Gold Hill. It is reached from Durkee by a wagon road  $3\frac{3}{4}$  miles long. In 1930 the property was under control of the Sawbridge interests of Spokane, Wash., with C. J. Reusch as manager. The property consists of 20 lode claims, 1 mill claim, and about 80 acres of deeded land. No work has been done for many years prior to 1930, but plans were under way at that time to reopen the mine. In 1914 Al Geiser of Baker did some work on the vein nearest the tunnel portal and recovered about \$1,000 in gold.

"The mine is opened by about 4,200 feet of drifts on the main level, three shafts, inaccessible at the time of visit, and numerous small prospect cuts on the surface. No data or production are available, but the output of the mine has been small.

"The country rock of the mine is almost wholly quartz diorite, although a short drift has been run on a fault contact between the quartz diorite and slate. Small quartz outcrops are numerous from top to bottom of Gold Hill, above the mine. Eight different veins have been cut in the workings.

"The first vein intersected by the main adit is the Spring Gulch vein, about 2 feet thick. About 600 feet of drifting has been done on this vein, which strikes about N. 60 degrees W. and dips steeply south. Farther south are four other parallel veins, the Judas, Bonanza, Gone Goose, and Panting. The last two were not visited because of bad air. The strike of these veins is about N. 65 degrees W. and the dip 30 degrees to 45 degrees S. Another vein, the Weatherby, is exposed to the south, on top of the hill, in some prospect pits. The exposures are so poor that no information can be given about this vein.



"The 'contact vein', followed by the 'contact drift', is a fault containing some vein matter and separates a footwall of slate from a quartz diorite hanging wall. Its strike is N. 60 degrees E. and its dip 30 degrees to 45 degrees SE. Owing to bad air it was impossible to map the workings in detail.

"The veins consist chiefly of quartz and sericite with some calcite. The wall rocks are intensely sericitized adjacent to the veins. The average thickness of the veins is less than 6 inches, but locally a width of 2 feet or even more may be attained. Considerable pyrite and small amounts of sphalerite and galena were seen. Serpentine is present in the faulted contact.

"Assays made by D. W. C. Nelson, of Baker, which were made available through the kindness of Mr. Reusch, showed that the Spring Gulch vein averaged \$14.66 over a width of 3 feet and the Bonanza \$15.70 over a width of 18 inches. Surface cuts on the Anzinger claim yielded quartz averaging \$34.14 to the ton, whereas the same vein yielded an average of \$60 to the ton over a width of 3 feet in the Porcupine tunnel. All the value in these assays was in gold. A sample from the surface on the Judas claim assayed a trace of gold and 32 ounces of silver to the ton."

Ref. Gilluly, Reed and Parks, 33:54 (quoted)

Property said to be in litigation. (Prescott 6/1/37.)

#### GOLD POINT MINE (Gold)

Lower Burnt River Area

Owners: V. T. Engstrom and J. W. Forsterling, Durkee, Oregon.

Location: McCord's Gulch in the E. half of sec. 20, T. 12 S., R. 44 E.

Area: 1 unpatented lode claim.

History: Worked by Engstrom in 1897-1898. Located originally by John Torrey who shipped 5 carloads of ore although a much greater amount was milled in an arrastra located on the property. This mine is said to have produced \$40,000.

Miscellaneous: The climate is relatively mild. There is no timber on the property and no water except one small spring. The old Chicken Creek ditch is no longer in operation. The property lies about  $\frac{3}{4}$  mile from the Sisely Creek road.

Geology: The country rock is granodiorite and the mine lies from 100 to 500 yards east of the contact with argillite. Ore appears in narrow veins usually less than 1 foot thick and averaging about 2 to 4 inches in thickness. From the previous

work the ore chutes appear to be about 60 feet apart, and about 15 to 25 feet in width. They rake 45 degrees to the SW. The vein systems split and join again but always remain fairly narrow. There seems to have been two periods of quartz deposition—the second one being barren. The veins strike N. 10 degrees E. to N. 30 degrees E., and average about N. 15 degrees E. They dip from 25 degrees to 45 degrees to the W., averaging about 35 degrees. Going south the ledge is faulted down and to the east. A diorite dike bounds the ore to the south but does not outcrop on the surface. The granite is soft, broken and altered around this dike and values are said to be good.

Informant: V. T. Engstrom. November 15, 1938. (J.E.A.)

#### GOLD RIDGE PLACER

Lower Burnt River Area

Located 5 miles south on the Rye Valley road from Durkee. Includes 4 placer claims, values reported to be good but water is scarce. Two hundred feet of tunnels have been run. (Prescott, 6/1/37).

#### GOLDEN ROD MINE (Gold)

Lower Burnt River Area

Owner: Stevens Goss, 2116 Valley Avenue, Baker, Oregon.

Mine is located 12 miles NE. of Durkee. Recently located and consists of a group of 10 lode unpatented claims. In a high mountain area; country rock is porphyry and slate; vein bearing north-east and southwest; width 4 feet to 15 feet. Water is ample; power can be obtained from the Idaho Power Company, nearby. (Prescott, 6/1/37.)

#### HALLOCK MINE (Gold)

Lower Burnt River Area

Owner: N. M. Hallock and M. J. High, Box 124, Durkee, and Port Angeles, Washington.

Operator: Not in operation at present. Some production by N. W. Hallock in the last few years.

Location: NW.  $\frac{1}{4}$  Sec. 2, T 12 S., R. 42 E. W.M. About 5,200 feet elevation. Above east headwaters of Chicken Creek. 7 miles to highway No. 30.

Area: Two unpatented lode claims: Flaming Arrow (1915), and Leona G. (1920).

History: Property was placed 40 years ago (1898) and has been under the present ownership since 1915 with an intermittent production. Between 100 and 200 tons of ore have been milled from the property. The production for 1936 was 32

ounces and for 1937 30 ounces. Several thousand dollars have been taken out.

Equipment: A small homemade 2-ton ball mill was run by an auto engine, the ore being then passed over copper plates for amalgamation. One ore car and some track.

Geology: The country rock is a biotite granodiorite intruded into a sericite schist and limestone lenses with very irregular contacts. The mine lies at the extreme north edge of the Chicken Creek batholith, and as far as could be seen there was no granite to the north. The vein system lies entirely within the granodiorite and strikes N. 68 degrees W. and dips 70 degrees to the north. The veins are narrow quartz stringers, clay gouge and much limonite, rarely over a foot in width. Well defined joint and fault planes striking easterly and westerly dip gently both north and south. The ore is completely oxidized in the upper levels, but some sulphide is said to appear in the lowest tunnel. The ore is free milling and soft, contains much lime. The quartz itself is not iron stained. In some places it is crushed to form a surgary mass. There has been a great deal of post-mineral movement. The vein system is parallel to the strike of the schist and limestone lenses. The veins are said to vary in width from 4 to 16 inches and in value up to \$80 per ton. Assays at the end of the No. 1 tunnel are said to have been \$40, and at the end of tunnel No. 2, \$13.50 per ton.

Development: Six tunnels and drifts total about 1,650 feet. At no place has the ore been mined deeper than about 60 feet, but practically all the ore above that level has been mined. A 25-foot shaft in the slate or schist a few feet north of the contact and just below a limestone lens was sunk on a narrow quartz stringer. It is said that a rich pocket was taken out near here years ago.

Informant: N. M. Hallock, June 14, 1938 (J.E.A.).

#### LITTLE BONANZA MINE (Gold)

Lower Burnt River Area

Owner: W. W. Gibbs, Sumpter.

Operator: Under lease to Jack Hinchey.

Location: Elevation about 4,500 feet. NE.  $\frac{1}{4}$  sec. 15, T. 12 S., R. 44 E., on an east fork of Hogback Creek near the Little Hill mine, which it adjoins on the south. About  $5\frac{1}{2}$  miles from the highway No. 30 at Weatherby.

Area: Six unpatented lode claims recorded in Baker county.

History: Located about 1890. It is said that \$40,000 was taken from one pocket along the basic dike and that the total production approaches \$200,000.

Geology: The country rock is biotite granodiorite, intruded by a basic lamprophyric dike, which, although highly sheared and altered, may be a hornblendite or pyroxenite. The dike strikes about north and is from 20 to 30 feet in width. It appears also in the Little Hill Mine workings. It is not exposed at the surface on the southern part of the claim but appears farther north. A vein strikes N. 10 degrees W. and dips 50 to 60 degrees W. A large vertical fault cuts off both the vein and the dike, and the values are found beyond this fault alongside the dike. Ore minerals are galena and pyrite, quite finely crystalline, in a gangue of sugary quartz and platy white hard quartz. The ore is said to be free milling, the gold being quite fine; and the ore runs from \$30 to \$125 per ton. The vein is about 4 feet wide, but it varies considerably. The ore pockets are very irregular but are closely connected with the basic intrusion.

Conditions affecting mining: Timber is scarce, being brought over 4 miles. Water is scarce; snow-fall moderate; and the roads to the property are poor but passable for nine months of the year.

Development: The mine has been developed by 2,000 feet of tunnels and two winzes, the one nearest the tunnel mouth being now 40 feet deep, and one 75 feet farther in, being 95 feet in depth. No ore has been discovered below the 45-foot level.

Equipment: An old three-stamp mill (building burned down) is on the property but not in use. A small gasoline engine and pump are used for pumping out the winze. The hoist is by man power, the small skip filling the car in six trips. Mine car and 500 feet of track.

Informant: Jack Hinchey, June 15, 1938. (J.E.A.)

#### LITTLE HILL MINE (Gold)

Lower Burnt River Area

Owners: Ida M. Bowen and Frank L. Bowen, 2235 Fourth Street, Baker.

Location: Elevation about 4,800 feet. Near center of sec. 15, T. 12 S., R. 44 E. About 5 miles from highway No. 30 at Weatherby. Near headwaters of Hogback Creek.

Area: 3 mining claims, lode, unpatented.

History: Discovered in 1882, but it has not been in any considerable operation since 1916, less than 100 feet of work in all. Said to have produced \$200,000.

Equipment: 2-stamp mill and small building. Powered by the truck that brings the ore from the Gold Cluster Mine (rear wheel drive). 3-foot and 7-foot copper plates, silvered, for amalgamation of ore that passes through 40 mesh screen. Ore from the Little Hill now being mined is being trucked all the way to Baker and milled in Leon Brown's small mill in Baker.

Geology: The country rock is a biotite granodiorite cut by small quartz stringers rarely over a foot in width. The system carrying the values seems to strike N. 65 degrees W. and dip towards the south. The quartz has in places been ground up by post-mineral movements to a fine sugar quartz associated with gouge of clay and sericite. The rather sparse spots of yellow iron oxide are not a necessary indication of values, which are said to be very spotty and in thin stringers, the shoots being quite narrow. Some sulphides are said to be found in the lower levels, and a panned concentrate showed fine pyrrhotite crystals. The ore is free milling and is said to yield about \$60 in the present operation, which is only 3 tons per week. Scheelite is said to occur at a depth of 20 feet in a shaft in the creek bottom.

Conditions affecting mining: Timber is very scarce, being brought a distance of over 4 miles. Water is not abundant but is sufficient for camping purposes and for a small mill. Snowfall is moderate in spite of the elevation, and all year operation is possible. Roads are poor and impassable for three or four months of the winter.

Development: Two of the three tunnels are caved. They are said to be 200 feet and 250 feet long. The main tunnel on the upper level is about 300 feet long, being quite irregular, as the old course along the vein is partly caved and trend is S. 65 degrees E. into the hill. Raises reach the surface at several points with from 20 to 40 feet of backs. One winze approaches the lower tunnel level. Across the creek to the northwest another tunnel and a 60-foot shaft have explored the vein.

Informant: Much of this information was given by Frank Bowen, owner of the mine. (June 15, 1938, J. E. A.)

Ref. Parks & Swartley, 16:142

## MANGANESE DEPOSITS

### Lower Burnt River Area

The manganese deposits have been inactive since the world war. There are many outcrops in this district, some of which are listed below:

1. Black Joe
2. Black Nigger
3. Black Prince
4. Corander
5. Prescott
6. Sheep Mountain
7. Utah

The best description is to be found in U.S.G.S. Bulletin 725, pages 224-228, 1921, by J. T. Pardee, reproduced below.

### Pleasant Valley Area

"Location and accessibility: Manganiferous deposits are found at several places near Pleasant Valley station on the Oregon-Washington Railroad & Navigation Co.'s line, in an area that lies from 12 to 20 miles southeast of Baker and can be easily reached from that place by automobile. From Pleasant Valley the Stephens and Capitola groups of claims are respectively 2 miles and 3 miles north, the Black Prince group and the Black Nigger claims respectively 2 miles and 5 miles northeast, and other claims from 4 to 7 miles east. The Stephens and Black Prince groups and several of the other claims are distributed along a belt that trends about N. 60 degrees W. This belt is approximately parallel to the valley of Alder Creek, through which the railroad goes, and from 1 to 2 miles northeast of it.

"Production: Most of the claims were located prior to 1917 for gold and silver, though very little development work was done on them. In 1917, according to reports, 450 tons of manganiferous material was produced from the Utah claim of the Stephens group. Most of this material was shipped to Tacoma and after being reassorted yielded about 300 tons of 40 per cent manganese ore that was used in making ferroalloys. The Utah and other claims in the Stephens group were idle when visited by the writer, September 4, 1917. Development workings on the Utah had reached a depth of 45 feet; elsewhere they consisted of shallow pits. No production was reported in 1918.

"Occurrence of tungsten: One feature of the Pleasant Valley deposits of more than ordinary interest is the association of tungsten with man-

ganese, as reported by Emil Melzer, of Baker, Oregon, who acquired control of the claims late in 1917. According to Mr. Melzer, a sample composed of material from four different bodies was tested for concentration by the Hendrie-Bolthoff Co., of Denver, Colo., the assays being made by E. E. Burlingame & Co. Of several different concentrates produced, one that represented the final product and amounted to 3.69 per cent of the composite sample carried 23.62 per cent of tungstic acid ( $WO_3$ ). This is equivalent to about 0.75 per cent of tungstic acid in the crude ore. Whether the tungsten came from one or all of the four different deposits represented by the sample or in which proportion from each was not determined, and the tungsten-bearing mineral was not identified.

"Ore bodies: The ore bodies are of moderate to small size and irregular form. Most of them are found near the surface along bedding planes or joints in the argillite and are associated with tabular or lenslike masses of fine-grained quartz. Ore obtained from them even by careful mining runs high in silica. The sample of crude ore reported by Mr. Melzer assayed 36.06 per cent of manganese, and the concentrate produced by reducing it about one-half contained 48.28 per cent of manganese, 13.40 per cent of silica, and 0.124 per cent of phosphorus. The largest body found on the Utah claim is in general terms a flat lens 20 feet wide (stope length), 30 feet long (pitch length) and 5 feet thick in the middle. It extends from a point near the surface downward along a wavy gouge-lined bedding plane or seam that has an average dip of 20 degrees E. Several smaller lenses are found below it to a depth of 60 feet on the slope, which is the limit of exploratory work. The ore is rather soft and cavernous and is composed chiefly of manganese oxides, clay, and quartz. The oxides are apparently an intimate mixture of pyrolusite, psilomelane, and wad.

"About 200 feet east of the deposit just described other bodies are developed by a 25-foot shaft, from which a drift runs east 63 feet and ends in a winze, inclined southwestward 30 feet deep. Water stands in the bottom of the winze, at a level estimated to be about 45 feet below the surface. The shaft penetrates an irregular cylindrical body about 10 feet in diameter and 15 feet long, composed chiefly of quartzose or silicified ar-

gillite. A small part of it is made up of indistinct veinlets and bunches of manganese oxides, among which pyrolusite and manganite were identified. The body is cut by a few stringers of a coarser-textured quartz with manganese oxides, and from its lower end several seams filled with manganese oxides and clay lead off along bedding planes. The drift follows a seam that is normally 2 or 3 inches wide but swells here and there into bunches or pockets, the largest of which is 5 feet in diameter. Another seam with several small pockets is developed by the winze. Ore from these pockets is said to carry from 35 to 45 per cent of manganese and 20 to 30 per cent of silica and to be practically free from iron. A shallow cut 20 feet west of the shaft exposes an 18-inch vein of flinty-textured quartz and manganese oxides that dips 50 degrees NE.

"On the Black Joe claim, about half a mile southeast of the Utah, a body of flinty-textured quartz with manganese oxides is exposed by shallow workings for a distance of 50 feet. This deposit is of tabular or vein form, is 4 feet wide, and strikes about east. Seams and small cavities in it are filled with the softer manganese oxides.

"Outcrops of many bodies similar to those in the Utah and Black Joe are reported in an area that extends from the vicinity of these claims southeastward for 6 or 8 miles. None are extensively developed. Several in the Capitola group of claims are said to occur in the limestone and to be high in iron. A body of manganiferous quartz 10 feet wide is said to form a prominent outcrop on the Black Prince claim.

"The manganese oxides were probably derived from rhodonite and rhodochrosite. Oxidation of the rhodochrosite was accompanied by shrinkage that gave the ore its cavernous texture. The distribution of the siliceous manganiferous bodies for several miles along a course that coincides with the general strike of the bedded rocks suggests that they are of sedimentary origin. On the other hand, the presence of vein quartz and the reported occurrence of small amounts of gold, silver, and tungsten indicate that they are similar in origin to the metalliferous quartz lodes of the surrounding region, which are believed to have been deposited by solutions ascending from some deep-seated intrusive rock.

"No good basis exists for making an estimate of ore in reserve. Probably, however, small amounts that contain 35 per cent or more of manganese ore are to be found, together with a comparatively large amount of highly siliceous material, which is rather poor in manganese but which may possibly be capable of beneficiation.

#### Sheep Mountain

"An undeveloped lode showing considerable manganese at the surface crops out in the claims located by John Arthur and others near the summit of Sheep Mountain, 7 miles west of Durkee. Sheep Mountain is a massive rounded knob on the ridge south of Burnt river that reaches an altitude of 5,325 feet, or about 2,300 feet above the stream. The prevailing rock is schistose argillite, presumably to be correlated with the argillite at Pleasant Valley. The outcrop, which is not conspicuous, ranges from 2 to 10 feet in width and extends from a point near the summit S. 50 degrees W. at least 4,000 feet down the slope. It consists chiefly of siliceous argillite traversed by small quartz veins, the whole fractured and partly replaced by manganese oxides. Irregular masses of manganiferous material as much as 3 feet wide and 6 feet long appear here and there. These are composed of streaks, nodules, and irregular bodies of psilomelane, pyrolusite, manganite, and wad bound together with a lattice of quartz seams. The body is cavernous, and the quartzose portions show some flattened cavities whose forms suggest they were molded around crystals of a carbonate such as calcite or rhodochrosite. An average sample of the material selected in mining is reported to carry 27.62 per cent of manganese and 42.48 per cent of silica. Possibly it can be beneficiated by ordinary methods of concentration. According to Mr. Arthur, a panning test yielded a concentrate containing 39.68 per cent of manganese, 24.60 per cent of silica, and 0.052 per cent of phosphorus. A small amount of ore is found that runs as much as 48 per cent of manganese, with 8 per cent or less of silica.

"The general features of this deposit suggest that it is to be classified with the metalliferous quartz lodes that are abundant in the surrounding region and like them was probably formed by solutions ascending from some cooling, deeply buried igneous rock."

#### McCord's Gulch Claims (Gold Quartz, Placer)

##### Lower Burnt River Area

Owner: C. E. Worthington, Huntington, Oregon.

Location: 1/2 mile east of Sisely Creek up McCord's Gulch in NE. sec. 20, T. 12 S., R. 44 E.

Area: 2 unpatented quartz and 1 placer claims.

History: Located in 1922 and 1937. Entire gulch was placered out 50 years ago during the Chicken Creek boom.

Geology: The placer claim is located 235 feet higher in elevation than Sisely Creek. For the first half mile up McCord's Gulch the bedrock is black talcose schist striking north and south standing vertical. It is then cut by granite which continues to the east. The placer claim lies across the granite contact. Numerous xenoliths of argillite are more or less altered to mica schist, mostly striking northeast and dipping steeply to the southeast. The amount of gravel is very small and consists mostly of material which is washed down since old placer operation. Probably values are very small in the gravel as none could be panned on the property when the visit was made. Such gold as is present is probably derived from the quartz stringers of the granite lying up stream from the claim. One such stringer only 100 yards northeast of the placer workings is being developed by a short tunnel at the present time.

Miscellaneous: Water is very small in amount but fairly constant. There is no timber.

(September 22, 1938: J. E. A.)

#### SCHEELITE PROPERTY (Tungsten)

##### Lower Burnt River Area

"Property consists of 5 claims owned by E. D. Morin, Adam Kolb and George Morin, of Baker, Oregon. Located 4 miles from Weatherby on Chicken Creek, in about sec 9, T. 12 S., R. 44 E. There is a fairly good wagon road from the property to the railroad at Weatherby. The region is hilly and for the most part barren, although timber is at no great distance to the northeast.

"Country rock is granodiorite and weathering has taken place, so that no fresh rock outcrops. Scheelite occurs in small quartz veins. The principal one is said to be from 2 to 14 inches wide. It strikes N. 40 degrees W. and dips 45 degrees to 55 degrees to the south.

"Development work consists of a prospect drift and short shaft. The shaft, which is sunk in the bed of Cricken Creek, is filled with water.

"No accurate sampling has been done, so that no information could be obtained in regard to the tungsten content of the veins, which also contain gold, as there has been, and still is, some placer mining in the immediate vicinity."

Ref. Parks & Swartley, 16:199 (quoted)

#### SUMMIT PLACER MINE

Lower Burnt River Area

Owner: Summit Mining Company.

"Office: 317 Board of Trade Bldg., Portland, Oregon. H. A. Moore, Pres.; Laura Moore, Sec.-Treas. Capital stock, \$9,000; par vale \$100; all subscribed, issued and paid up. (1916 report.)"

"This company has the Summit placer mine, located in Lost Basin, Baker county, which is close to Pedro mountain in T. 12 S., R. 42 E."

No new information. Property not visited.

Ref. Parks & Swartley, 16:216 (quoted)

#### TUNGSTEN CLAIM

Lower Burnt River Area

Owners: John Demas, Baker; Matt Verhaage, Lime.

Location: Near headwaters of Chicken Creek, on old placer ground. NW.  $\frac{1}{4}$  sec. 15, T. 12 S., R. 44 E., on E. side of creek.

Geology: Quartz stringer 1-3 inches wide averaging 2 inches, at least 30 feet long, in granodiorite. Strike NE. and SW. dips 55 degrees NW. Shaft on stringer variously reported as 40 to 80 feet deep. Stringer said to carry over 5% scheelite.

Informant: Verhaage. (J. E. A.)

#### TWIN SISTER CLAIM

Lower Burnt River Area

Operators: Mr. and Mrs. Elmer Ferney, Clifford Bunch, Willard Bunch, Lawrence Bunch, Durkee, Oregon.

Location: Arrasta Creek, sec. 34, T. 11 S., R. 44 E.

Area: 1 claim.

History: Milled some ore in 1935-36. About 1 ounce per ton—milled 15-20 tons.

Development: 200 feet of tunnels (3 tunnels).

Along Arrasta Creek; veins located in digging spring.

Equipment: Small ball mill, small copper plate, small riffle box. Only saved about half of values.

Not visited. (J. E. A.)

Informant: Elmer Ferney.

### MORMON BASIN AREA

(Mormon Basin, Dixie Creek, Rye Valley, and Malheur Districts)

#### Geography:

This district extends from Rye Valley, Upper Dixie Creek, westward to Malheur City. It thus takes in both slopes of the divide between Upper Dixie Creek and Willow Creek. Since this divide is the county line between Baker and Malheur Counties the district is in both counties. The Mormon Basin region proper is close to the divide. It is a true basin in shape with many small gulches draining towards the central part where they unite with Mormon Basin Creek, which makes its exit through a small canyon in the southern rim. The elevation of the floor of the basin is about 4,700 feet and it is probable that the maximum relief is about 1,000 feet.

The steep sloping hills are covered with sagebrush and the higher elevations with sparse timber. There is slight precipitation, while in winter the snowfall is not heavy enough to be of any great inconvenience. The railroad points are Dur-

kee, 22 miles away, and Huntington, 25 miles distant.

The geologic history of this immediate vicinity is similar to that of many other regions of eastern Oregon, but with certain phases somewhat accentuated. Gilluly, Reed and Park (33) have published a geologic map of the district. The oldest rocks, which are also the predominant ones, are a series consisting chiefly of what were originally mudstones, sandstones, and siliceous and calcareous sediments. Interbedded with these may have been some lava flows or perhaps the basic igneous rock was intrusive into sediments in the form of sheets and sills.

This series was then subjected to severe mountain building forces which folded and faulted the rocks and altered the shales, sandstones, siliceous and calcareous rocks into slates, quartzites, cherts and marbled limestones. By these same forces the basic igneous rocks were altered until they now

consist of secondary hornblende, serpentine, and other green-colored minerals, so that they are now called greenstones.

Just at the close of this period of mountain building which contorted, fractured, and changed the series into rocks very much as they are at present, there came a granitic intrusion. The largest batholithic mass now exposed by erosion is that of Pedro Mountain to the northeast. A stock of considerable size occurs west-southwest of the basin and can be seen along the road to the town of Malheur. Generally speaking the rock is a granodiorite of medium granular texture and consists of andesine feldspar with quartz, hornblende, and biotite and small amounts of magnetite. There are of course local variations in its composition due to magmatic differentiation, increase of quartz bringing it nearer a granite, the decrease of quartz making it a quartz-diorite while the absence of quartz makes it a diorite.

Accompanying the intrusion in its closing phases were the characteristic dikes of porphyry and aplite. The first mentioned type are of peculiar interest in this region on account of the well-known "spotted" dike of the Rainbow mine. This particular rock is described under the section on that mine.

The heat of the intrusion as well as the emanations from it contributed further to the metamorphism of the overlying rock. During the cooling of the magma the region was under stress and the resulting fissures were filled with molten material which upon solidifying formed the dikes that have just been mentioned. Later when much of the magma had solidified the fissures which were formed at this time were filled with ascending silica solutions. These solutions deposited their quartz in the veins, and the precious metals and other minerals also. In this particular region movement took place during vein deposition as is shown by cemented vein breccia in many of the veins.

The mineralization of the veins in Mormon Basin varies. In some a large percentage of the gold is free; in others it is contained in sulphides which are chiefly arsenopyrite, and pyrite with minor amounts of sphalerite and galena.

After the veins were formed there was a period of erosion. Then came the outpourings of Tertiary lavas and the formation of lake beds during the same age. Both acid and basic lavas are to be

found in this vicinity. The former which were probably earlier are represented by rhyolites and trachytes. In the Humboldt mine there is a dike of altered rock that was probably a feeder to one of these later flows.

Lake beds were formed in the lower part of the basin and probably have a thickness of a hundred feet or more. In places they are interbedded with altered trachytic flows. The lake beds vary in character from coarse gravel to clay. It is probable that the placers of today were at least partly formed by the destruction of gold bearing Tertiary gravel beds by present day streams.

The basic lavas are represented by basalt as in other parts of the eastern Oregon region. They are probably somewhat later than the lake beds. Basalt is found on many of the ridges.

Since the Tertiary series of lake beds and lava flows were laid down considerable movement has taken place, as is shown by their tilted and faulted condition.

Recent erosion has taken away much of the Tertiary covering. The present day placers have been formed by the wearing away of auriferous veins and the consequent deposition of the gold in the stream channels and also by the reconcentration of gold-bearing gravels of the lake bed formation.

This region is particularly difficult to prospect as is evident by the many abandoned tunnels. The cause of this difficulty is the close resemblance in places of the lake beds to the older altered rocks. Fragments of gold-bearing quartz in the coarser deposits of the lake beds entice the prospector to drift underneath ore at the surface which is not in place. The amount of wash or mantle rock is often such as to hide the true character of the bedrock. In some parts of the Basin faulting and shattering is particularly prevalent and here even when a true vein is found it is difficult to follow.

#### History:

Willow Creek is one of the largest tributaries of Snake River and enters it a short distance above Huntington. A bare ridge, 1,000 to 2,000 feet high separates Burnt River and Willow Creek. On the slopes of this ridge and from 6 to 12 miles west of Rye Valley are a number of well-known old placer camps—Clarks Creek and Bridgeport on Burnt River and Mormon Basin, Amelis, Malheur

and Eldorado on the Willow Creek side. The operations have largely ceased in most of these camps.

The Rye Valley placers were discovered shortly after 1862 and have been worked up to the present time with a total production of more than \$1,000,000. Water is available for only a few months in the year.

Dixie Creek has been placered for 3 miles above the town but the high gravel bars have produced by far the most gold. Years ago it was proposed to dredge the stream bed but a depth of 90 feet has discouraged the attempt although borings are said to show an average value of 30 cents a yard.

A number of quartz veins have been found near Malheur but as yet none of them has become a steady producer. The Red, White and Blue vein near Malheur has been developed by a shaft and has produced at times. It is said to be a vein 2 feet wide contained in a clay slate which is cut by diorite dikes.

A number of quartz veins containing silver have been found on Pedro Mountain and attracted attention 60 years ago. The veins were rich in silver, but little has been done upon them in the last few years.

The production of the Mormon Basin District from its placer mines, although large, is not known. The greatest production from quartz mines was for the ten years (1906-16), approximately \$2,225,000.

#### BLUE MUD PROSPECT (Gold)

Malheur County—Mormon Basin District

Owners: Ralph Gorman, James Kidwell, and John Kerman Estate. Idle.

"The Blue Mud prospect, owned by R. L. Gorman, is about 1,500 feet southeast of the Humboldt mine.

"The property is developed by means of several tunnels, now caved, and a shaft about 200 feet deep. This work is in Tertiary gravel and pre-Tertiary greenstone, chloritic schist, and gabbro. It has been carried on in search of the bedrock source of very rich float found in the Tertiary gravel just down the hill to the north.

"The shaft, whose mouth is in Tertiary gravel and which penetrates greenstone and metagabbro below a depth of about 100 feet, was full of water at the time of the visit, but a lower tunnel, whose adit is just north of the contact between the Tertiary and pre-Tertiary rocks on the west side of

Basin Creek, at the head of the canyon, was being driven to tap it at a lower level and drain it for working. In an excellent exposure of the fault contact between the Tertiary gravel and the pre-Tertiary rocks. Considerable water was coming into the drift at this contact. According to William Phalen, the water in the shaft was also derived either from this fault or immediately below it. An excellent vein is reported to have been cut in this shaft, and it is hoped that completion of the drain tunnel will permit its further development."

Ref. Gilluly, Reed, & Parks, 33:47 (quoted)

#### BORDEN CLAIM (Gold, Silver)

Baker County—Mormon Basin District

One of the owners is Jess W. Baker, Baker, Oregon.

The Borden Claim is 25 miles southwest from Durkee. Only partially developed; has 450 feet of tunnels.

Informant: Prescott.

#### CLEVELAND DEVELOPMENT CO. (Gold)

Malheur County—Mormon Basin District

"The Cleveland Development Co. has 15 claims on the south side of California Gulch above the confluence with Basin Creek.

"The workings were all inaccessible at the time of this survey, but according to Parks and Swartley they originally consisted of two tunnels and several pits. The lower tunnel penetrated Tertiary sediments and then schist and greenstone, finally following a porphyry dike that contained a few quartz seams. The dike is a few feet wide, strikes N. 75 degrees E., and dips steeply south.

"No production has been reported from the property, and apparently no work had been done for many years prior to this survey."

Ref. Parks & Swartley, 16:56

Gilluly, Reed, & Parks, 33:47 (quoted)

#### COLT PLACER PROPERTY

Malheur County—Mormon Basin District

Operators: Mormon Basin Partnership (W. E. Buell, C. A. Meyer, Fred Miller, Carl R. Suksdorf, Route 1, Huntington).

Location: Center of W. ½ of sec. 21, T. 13 S., R. 42 E.

Area: 160 acres.

History: The placers in Mormon Basin have been worked ever since the '70s. The last big operations were in 1908; smaller operators have



worked every year since. During the last 20 years it has been mostly sniping. The present program is a prospecting one, and large-scale operation is not intended for at least another year. The work going on at present is to determine the best method for working the old placers on Norton Point—about 3 or 4 acres.

Equipment: 250 feet of 8-inch pipe, 250 feet of 7-inch pipe, with 3 No. 2 Giants.

Development: The present operation has been developed by 40 test pits and 2 large pits 40 feet by 50 feet in diameter. A 25-foot sluice channel has been dug. Water supply: In a good year such as 1938 the mining season is from March 30 to June 30. The ditch in use is 3 miles in length. All water rights belong to this property. In an average year there is only 2 months or less working time. The best run this spring was 38 miners inches, with 40 inches running over the penstock. One can generally count on a steady 50 inches for one month. If other ditches are used, more water is available. The head is about 60 feet for this ground.

Geology: Elevation 4,750 feet to 4,850 feet. The false bedrock consists of decomposed, transported granite debris highly micaceous. There are intercalated layers from 1 foot to 5 feet thick of yellow, shaly clay, angular slate and schist gravel and more micaceous granite debris. The total thickness of workable placer above this bedrock is not over 8 feet. Hydraulic giants will not cut the ground without preliminary blasting. A dipper shovel will probably be the final solution, but the ground must be tested first. Large boulders up to 2 feet in diameter and lack of adequate grade will also be serious handicaps to be contended with.

Values are scattered throughout the 8 feet, only slightly concentrated on the bedrock. The average is about \$2 per yard and is a rough estimate. Panning showed about \$2.25 per square yard of bedrock. These estimates are very rough, as the test runs had been few. It is more probable that the values will run between 60 cents and \$1.50 per cubic yard.

Informant: C. R. Suksdorf through J. E. A., 38.

#### FAIRVIEW CLAIMS (Gold)

Baker County—Mormon Basin District

Located recently by Roy and Rollie Chadwell.

Also in Lost Basin. Is 18 miles from shipping point, Durkee. Only location work and a small

amount of development has been done. There is water and timber on claims; also an ore car, track, and light mining tools. There are 200 feet of tunnels.

Informant: Prescott, 37.

#### GIRAFFE MINING AND MILLING CO. (Gold) Baker County—Mormon Basin District

A. O. Weatherman, Pres.; J. S. Dane, Secy.; Bridgeport, Oregon. Capitalization \$150,000. (1937 report.)

"This company owns 7 claims on the east slope of Clarks Creek in sec. 31, T. 12 S., R. 42 E., about 1½ miles north of the Humboldt mine. The ore is a narrow mineralized granodiorite porphyry dike in a country which is largely argillite but also has serpentine and dikes of basalt. A considerable body of lime is a short distance to the north of the property and granodiorite to the east.

"On the Giraffe claim No. 1 a drift upon the dike was made from which 200 tons were milled and \$7.50 per ton was recovered on the plates. A recent independent sampling of this drift gave an average of \$4.20 per ton. About 750 feet north of the above drift, on the Giraffe No. 2, a crosscut tunnel cuts the dike at a depth of 85 feet where the values are about the same as above. A crosscut is being driven on this claim to cut the dike at a depth of 300 feet. This crosscut will be about 500 feet long and it is now nearly in."

Ref. Parks & Swartley, 16:99 (quoted)

#### GOLD COIN PLACER

Baker County—Mormon Basin District

"This property is located about 2 miles southwest of the Gold Ridge, about ½ mile north of the Rye Valley wagon road and 8 miles from Durkee. It is almost at the summit of the ridge that lies between the Rye Valley road and the Gold Ridge mine. It occupies the southern side of the hill and reaches an elevation of about 500 feet above the road.

"The gold is found in gravel beds belonging to the Tertiary Lake Bed formation. The beds are tilted and somewhat faulted. They consist of pebbles of quartz, flint, greenstone, granite, rhyolite, and volcanic tuff. The finer material is usually granular, although some clay is present in places interbedded with the gravels.

"There are many other placers in this vicinity, but for the most part they have been worked in a small way."

Ref. Swartley, 14:229  
Parks & Swartley, 16:102 (quoted)

#### HICE MINE (Gold)

Malheur County—Mormon Basin District

"The Hice tunnel is on the hillside about 2,000 feet south of the Humboldt. There are about 400 feet of workings, consisting of a tunnel about 250 feet long with several short branches.

"The principal country rock is partly albitized diorite, a local variant of the widespread quartz diorite of the district, with some included hornfels and a few thin dikes of albite aplite. A good many thin quartz veins ranging between one-fourth inch and 4 inches in thickness are present; the most prominent strike north and dip east at flat angles. Considerable sericite accompanies these veins, and locally the diorite is silicified and impregnated with sulphides. Ankerite is a prominent constituent of the quartz veins."

No production has been reported from this prospect.

Ref. Gilluly, Reed, & Parks, 33:46 (quoted)

#### HUMBOLDT MINE (Gold)

Malheur County—Mormon Basin District

Owner: John Kernan estate, Portland, Oregon.  
Production \$150,000.

"The Humboldt mine is in the southwestern part of the basin. The mine, which had been idle for 15 years at the time of this survey, was full of water, badly caved, and inaccessible. It was operated for several years prior to 1916 by the Oregon-Idaho Investment Co. In 1909 it was the most productive mine in the district. In 1910 it had a 200-foot vertical shaft, 2,000 feet of tunnels, and a 10-stamp mill. Electric power was brought to the property in 1912, and 20 stamps were dropping in 1914, but in 1916 it was closed down. In 1930 the property was owned by R. L. Gorman. No definite figures could be obtained on the production of the mine, but it is known to have been moderate.

"The mine has been described by Swartley (14:224) as follows:

"Formerly the mine had four levels and was worked by means of a vertical shaft. Recently the shaft has been sunk 100 feet deeper and a cross-

cut driven to the vein, upon which drifting has been started.

"There is a 20-stamp mill upon the property in which recovery is by amalgamation and concentration with Wilfleys and vanners. A considerable percentage of the gold is free milling. The concentrates are shipped to smelters, but it is proposed to install a cyanide plant to treat the tailings.

"The many movements that have taken place in this immediate vicinity have caused the geology to be confusing. The chief country rock is slate with diorite porphyry in the footwall. In the upper levels trachyte is said to form a large part of the hanging wall. This trachyte was probably a feeder to some of the recent acidic lava flows.

"The lode has an east-west strike and a dip of 75 degrees N. in the upper levels but with a steeper dip below. In some places the lode is as much as 40 feet wide, but the actual quartz veins are rarely more than a few feet thick.

"The chief gangue mineral is quartz, and much of it is in a sugary condition due to crushing by later movements. Some calcite is present in the vein. The ore, especially in the upper levels, is free gold, and many fine specimens have been taken from the mine. In the lower levels more sulphides are to be found. They are chiefly arsenopyrite, pyrite, galena, and sphalerite. The galena and sphalerite are said to contain high values in gold.

"The Humboldt lode is situated in a zone of weakness, where fracturing and movement have taken place many times. The first break allowed the injection of the diorite porphyry that is found on the footwall. Then came the fracturing that made the opportunity for the hot ascending silica solutions to deposit their burden of quartz and metallic sulphides. Movements took place during the period of vein formation, as is evidenced by the recementing of broken quartz fragments. Considerable post-mineral movement has taken place, as is shown by the sugary quartz, the gouge, and the actual faulting of the vein in the lode."

Ref. Swartley, 14:224 (quoted)  
Gilluly, Reed & Parks, 33:45 (quoted)

#### INDIANA MINE (Gold)

Baker County—Mormon Basin District

Owners: George Bertrand, Thomas Thompson, Otto Zimmerman, and Frank Klein, all of Baker, Oregon. Each owns  $\frac{1}{4}$  undivided interests.

Location: 9 miles south of Durkee in the center of the south half of sec. 11, T. 12 S., R. 42 E., on the head waters of Sinker Creek.

Area: 6 unpatented lode claims.

History: First worked in the 1890's when quartz float was hauled from the surface and shipped. Total production possibly as great as \$10,000; \$5,000 said to be taken from the upper workings alone.

Equipment: 5-stamp mill and amalgamation plates, 2 cabins, no cars or track.

Development: 5 shafts and 1 long crosscut tunnel with 200 feet of drift and 50-foot winze; shafts are all caved.

Miscellaneous: No timber. Water inadequate. Two springs will fill  $\frac{3}{4}$ -inch pipe in the wet season. It is  $4\frac{1}{2}$  miles by very steep mountain road to the foot of the hill south of Durkee.

Geology: The lower tunnel alone is accessible part of the year. 30 feet from the portal the tunnel passes from granite to a very much sheared altered "porphyry". The contact runs about east-west and dips 65 degrees to the S. It is a clean-cut fault which has been followed in one direction for 100 feet. There is no mineralization on this fault. The main vein runs at right angles to the contact or about north 20 degrees E. It dips between 40 degrees and 50 degrees to the west. The main vein consists of from one-half inch to three feet of brecciated and recemented glassy quartz with only a small amount of sulphide but with considerable hematite and manganese oxides. Free gold can be seen with a hand lens. The vein and country rock are cut by a number of faults trending west-northwest and dipping south.

Informant: Otto Zimmerman through J. E. A., 38.

#### INTERMOUNTAIN MINE (Silver)

Baker County—Mormon Basin District

Owners: Wess Bowden, et al.

It is 18 miles from Durkee. Opened by a tunnel about 1,000 feet long. It has produced some high-grade silver in the past, and a new tunnel is being driven farther up the hill. No work except assessment.

Informant: Prescott, 37.

#### LUCKY STRIKE (Gold)

Malheur County—Mormon Basin District

Owner: Bent Landreth, Baker, Oregon.

This is 22 miles from Durkee and consists of 2 unpatented claims, joining the Rainbow Mine

on the west. Country rock is greenstone and granite; vein bears northeast and southwest, width 6 feet. Water can be pumped from shaft; power is available from Idaho Power Company nearby.

Informant: Prescott, 37.

#### MAMMOTH GROUP (Gold)

(Black Eagle Mine)

Malheur County—Mormon Basin District

Owners: Theodore S. Glenn, Baker; Ed Graves, Durkee; Lambert, Durkee; now under lease to Silva Corporation, Colonel William Braden, agent.

Location: Sections 19 and 20, T. 13 S., R. 41 E.;  $\frac{1}{2}$  mile northwest of town of Malheur.

History: A mill is said to have been built in 1905 by J. F. Meikel consisting of 20 stamps and amalgamation plates (this was bought by Vinson in 1910 and put up on the Inter-mountain property). The mine was under bond and lease to W. C. Bess in 1906-7. There has been no ore milled since 1907. The ground up to the mine was placered before 1905 by W. S. Boswell. The mill operated at 100 tons per day for 7 months according to Bodfish.

Geology: The country rock is a light colored porphyry granodiorite said to occur in a wide dike running northeast and southwest for about a mile. The mining was done in a highly altered limonite zone running north-south vertically for about 100 feet and varying from 10 feet to 20 feet in width. Two 35-foot shafts were sunk in this ore, which, as soon as they reached the unaltered porphyry, lost their values. The gold occurred in the thin iron veinlets or seams in the broken, soft, oxidized rock and is definitely a secondary enrichment. Fragments of fresh rock from the bottom of the shaft show fine disseminated sulphides. Two glory holes 75 feet apart were later tapped, and all the enriched ore was removed.

Economics: At the present time Braden, acting for the Silva Corporation, is engaged in extensive prospecting with caterpillar tractor. Apparently, the object is to determine whether the values in the unaltered portion are sufficient, and can be recovered so as to make the property a large low-grade mine.

Informant: George H. Bodfish, who was mill operator in 1905-7 and has lived in Malheur ever since, through J. E. A., 38.

**MONARCH GOLD DREDGING CO.**

Mormon Basin District

W. A. Noon, Pres., W. J. Noon, Secy.-Treas. Capitalization, \$300,000. Dissolved by proclamation December 31, 1938.

**MORMON BASIN MINES, INC. (Gold)**

Baker and Malheur Counties—Mormon Basin District

Capitalization \$500,000. F. W. McDonald, Pres., Seattle, Washington. W. J. Noon, Secy.-Treas., Baker, Oregon. 1937 report to Corporation Commissioner also states that the company owns:

The Rainbow Mine of 6 patented and 18 unpatented claims (which see).

The Rainbow Extension Mine of 5 unpatented claims. (No description.)

The Regal Mine of 5 unpatented claims. (See Randall.)

The Randall group of 4 unpatented claims. (See Randall.)

**MORTON PROSPECT (Gold)**

Mormon Basin District

"The Morton Prospect, owned by the Morton brothers of Vale, Oregon, is on the divide between Glengarry and French Gulches near the west side of the Mormon Basin. The prospect is entirely in an old soil of Tertiary age made up of decomposed quartz diorite debris, which the shaft, reported to be 96 feet deep, has failed to penetrate. This decomposed diorite contains considerable very rich quartz float, but the parent vein has not been found."

Ref. Gilluly, Reed, & Parks, 33:48 (quoted)

**ORA MARMO (Gold)**

Malheur County—Mormon Basin District

Owners: Mrs. D. D. Smith, J. W. Bowden, Wm. and Donald Kempfer, Unity, Oregon. Operated under lease by Charles C. Capschull, Deerfield, Illinois.

Location: SE. corner of sec. 21, T. 13 S., R. 41 E., elevation 4,950 feet.

Area: Four unpatented lode claims, and two fractions.

History: Claims located in 1921, not previously worked. Half a mile southwest of the old Rainbow mine.

Equipment: 100 feet of track, 1 car, gasoline pump, gasoline hoist (1 cyl. horiz.), forge, tools, anvil. New shed, 20 by 50 feet. Two cabins.

Geology: The country rock is a hard black shiny meta-shale, mapped as talc-schist. The development work was done to find an andesite dike which does not outcrop, and along which values occur. Shafts were full of water and tunnels caved, so that no underground inspection could be made. In the main shaft, it was said that at 120 feet they cut a 8 to 10-foot stringer running \$2.80. The shale strikes N. 51 degrees E., and dips 50 to 55 degrees N. The ore consists of pyrite and chalcopyrite in a bluish quartz. In the lower tunnel a small band of black limestone was cut, along which it was said that a small stringer of free milling gold occurred. Sphalerite also is said to appear, but no galena.

Miscellaneous: The property lies 21 miles from the railroad. No timber is on the claims, but it is available nearby. Power is available in the power line built to the Rainbow mine.

Development: A 309-foot tunnel and 55-foot winze picked up the andesite dike. The new shaft is down 185 feet, and the owners expect to cross-cut 80 feet to the south to pick up the dike again.

Informant: Underground information by D. Kempfer through J. E. A.

**OREGON DREDGING COMPANY**

Baker County—Mormon Basin District

Property is operated by the Pioneer Dredging Company, with a 7½-foot Marion electric dredge. Area consists of the entire length of Clarke Creek and has produced \$500,000. Operations have been carried on intermittently since 1926. Report made by W. J. Noon, Baker, Oregon. Idle on January 8, 1939.

Informant: Prescott, 37.

**OVERSHOT GROUP (Gold)**

Baker County—Mormon Basin District

Owners: Albert Hindman Estate, Ed Graves, Deardorf Estate, Chas. McNamara, Durkee.

Location: Elevation 5,250 feet, in the NE. ¼ sec. 14, T. 13 S., R. 42 E., in the NW. portion of Mormon Basin.

Area: Six unpatented lode claims.

History: Located in 1907 by John Clark.

Equipment: Cabin and small amount of track. Old bunkers rotted away.

Geology: The vein strikes NE., with footwall of granite and hanging wall of diorite. Vein averages 3 feet wide, assaying \$10 in gold.

Development: 300 feet of tunnel, inaccessible.

Miscellaneous: Water is scarce, power available from Idaho Power line nearby. It is 22 miles from the shipping point at Durkee.

Remarks: This information entirely from the files of John Prescott, WPA. The tunnels are caved and the property could not be entered. Material on the dump suggested that the country rock was gabbro, greenstone, and some argillite. No granite. June 16, 1938. Informant: J. E. A.

"The country rock is chiefly slate and quartz-mica schist striking about N. 45 degrees W. and dipping steeply northeastward. The schist and slate have been intruded, for the most part concordantly, by small sheets and sills of altered quartz diorite, with a few dikes—all too small to be shown on Plate 2.

"No veins are cut by the workings. A few very thin quartz-filled fissures are present, but these are small and discontinuous. According to Mr. McNamara, the gold is found in the altered diorite or near its contact with the schists. No production has been reported."

Ref. Gilluly, Reed, & Parks, 33:43 (quoted)

#### QUICKSILVER AND EASY MONEY CLAIMS (Quicksilver)

Mormon Basin District

Owners: John Joseph, T. R. and Vernon Jeffords, Ed George.

Location: 2½ miles up S. fork Clarke Creek, elevation about 4,500 feet, in sec. 11, T. 13 S., R. 41 E.

Area: Two unpatented lode claims.

History: Unknown. Located May 16, 1938, by grubstakers. Old tunnel from below location cuts, S. 85 degrees E., about 150 feet. (Caved.)

Equipment: Over 40 feet of track in old tunnel.

Geology: The country rock is a fine-grained diabase or gabbro, into which came an intrusion of hornblende trachy-andesite, along which the mineralization seems to have taken place. The rock is highly altered for a distance of at least ten feet from the surface, and at only one or two small places is relatively fresh rock exposed. There are 8 new prospect pits, the largest being 30 feet long and 10 feet deep. The rock is soft, highly iron stained, and assays show a trace of cinibar in the red material which is not visible in the hand specimen. Quartz from the pits and tunnel indicated that there is a dike of that material up to

1½ feet wide, one specimen of which showed a trace of gold.

Miscellaneous: The property is located near the top of the plateau, a steep trail leading down ¼ mile to the old road below. Thence it is 25 miles to the railroad at Durkee. Water is scarce, timber abundant.

#### RAINBOW MINE (Gold)

Baker and Malheur Counties—Mormon Basin District

Owners: Mormon Basin Mines (~~which see~~).

"Location: The Rainbow mine is just north of the divide between California Gulch and a southern tributary of the south fork of Dixie Creek, locally known as Rainbow Gulch.

"History and production: The deposit of the Rainbow mine was discovered about 1901, and the Commercial Mining Co. was organized to develop it. By 1907 the mine was a large producer, with a mill of 19 stamps. The capacity of the mill and concentrator was 50 tons a day in 1909. In 1911 no ore was raised, although development work went forward, and a fair production was made from cyaniding tailings. In 1911 the mine was sold under option to the United States Smelting, Refining & Mining Co., of Boston, Mass. This company operated the mine for 32 months until December, 1915, when, by failing to take up the option, it permitted the mine to revert to the original company. In 1916 the mine had a 400-foot shaft, a 1,500-foot adit, and 3,700 feet of drifts and crosscuts. A 100-ton mill and cyanide plant was on the property. A 100-foot winze was sunk from the 400-foot level. In 1918 the mine was closed and dismantled. A small production was made in 1922 and again in 1925 from dump rock worked in a 10-ton mill. In 1926 the mine was sold to the present owners, the Rainbow & Sunday Hill Mining Co.

"The production prior to 1911 was \$242,000. The United States Smelting, Refining & Mining Co. produced \$1,083,360 from 95,747 tons of ore, saving \$11.40 a ton from \$12 mill heads. During 1913 to 1915 the mine was the largest producer in the state, but the production since December, 1915, has been small.

"The mine buildings and shaft timbers have been destroyed by fire, and many of the old stopes have caved to the surface, so that the mine was entirely inaccessible at the time of this survey.

"Geology: The geology of the Rainbow mine has been described by Swartley (14:220) as follows:

"The geology of the Rainbow mine is comparatively simple; the country rocks are chiefly slate with some granitic intrusives on the hanging wall side and some limestones and greenstones on the footwall side. The greenstone (shown on pl. 2 as gabbro and related ultrabasic rock) is an intensely altered rock with an excessive development of secondary hornblende; its original character is hard to make out.

"The vein fissure has a strike of N. 60 degrees E. and in the upper levels a dip of 66 degrees N., while in the lower levels a dip of 54 degrees N. Before the period of vein formation the fissure was filled with a porphyry dike locally known as the 'spotted dike'. \* \* \* This rock is a porphyry genetically related to an intrusive magma that is probably a basic granodiorite or quartz diorite or perhaps even a diorite in composition. \* \* \* The Rainbow vein is not of the fissure type but of the brecciated vein type. The fractured zone varies from a few feet in width in some places to over 50 feet in others. It is made up of fragments of country rock cemented by quartz. The porphyry dike is included in the brecciated zone to a large extent. On both walls of the lode there is a quartz vein. The footwall of the lode is the best developed and has been most worked. The vein quartz is fine grained and contains but a very small amount of arsenopyrite and pyrite in which there is some gold. Some of the free gold in the vein is large enough to be distinctly visible, but for the most part it can not be seen. A small amount of actinolite and a little chlorite occur with the quartz, and when these minerals are present the gold values are said to be greater. This is noteworthy as it points toward the precipitating action of the ferromagnesian silicates.

"There has been some movement since ore deposition, as is shown by the gouge and slickensides. The quartz, however, is not fractured to any great extent.

"The genesis of this vein is simple, that of ascending solutions from the underlying magma. The presence of the porphyry dike shows that the vein fissure followed this line of weakness.

"The mine is worked through a shaft about 500 feet deep, but most of the development has been

done on the 200 level, where the vein has been drifted upon for 1,700 feet. Mine and mill are operated by electricity with power furnished by the Idaho-Oregon Light & Power Co."

Ref. Gilluly, Reed, & Parks, 33:37 (quoted)

#### RANDALL (Gold) (Also Regal)

Baker and Malheur Counties—Mormon Basin District

Owners: Mormon Basin Mines (which see).

"The Randall tunnel is at the south end of Sunday Hill, in the northwestern part of the Mormon Basin. It was under the management of William Phalen at the time of the survey. Little but assessment work was being done. No production has been recorded.

"There are about 1,200 feet of workings. Two tunnels have been driven, the upper one 24 feet above the lower, and a quartz vein has been drifted on for about 300 feet on the lower level.

"Two quartz veins are penetrated by the lower adit, one at 245 feet from the portal and the other near the face. The first strikes about N. 60 degrees W. and dips about 32 degrees SW. and has been drifted on for 100 feet east of the tunnel. It has also been followed westward for nearly 175 feet, curving slightly northward. At this point it is intersected by a much larger vein, which strikes nearly north, perhaps a little east of north, and dips about 35 degrees E. This northward-trending vein has been obliquely penetrated by the drift for about 50 feet. It is fully 8 feet thick, but no wall is exposed at the face. The footwall, poorly exposed, seems to be schist.

"The northwestward-trending vein ranges from somewhat less than 2 feet to over 5 feet in thickness. It has a hanging wall of seritic gouge, apparently a fault. Several small southeastward-trending footwall branches occur along this vein. None is over 6 inches thick, and they are apparently not persistent.

"A second northwestward-trending vein is penetrated by the lower adit near the face. This vein is much thinner, being only about 6 inches thick at the floor of the tunnel, and has not been found on the upper tunnel level. It strikes N. 70 degrees W. and dips 45 degrees NE.

"The first northwestward-trending vein is also narrow on the upper level, and only about 10 feet of drifting has been done on it. The northward-trending vein has not been cut on this level

nor in any of the several surface cuts, most of which are too far east to intersect it if the vein has a constant attitude.

"The veins consist largely of quartz, with some ankerite, fuchsite, and sericite. Small amounts of sulphides, chiefly pyrite and arsenopyrite with smaller amounts of hessite, galena, and sphalerite are present. Much of the gold is free, as all the workings are in the oxidation zone. Oxidation products include cerussite and jarosite.

The assays, reported by Mr. Phalen, show from \$10 to \$15 a ton in free gold, with some gold also in the sulphides.

Further drifting on the wide vein at the face of the west drift on the lower tunnel is contemplated."

Ref. Gilluly, Reed, & Parks, 33:41

#### REGAL

Mormon Basin District

(See Randall.)

#### REGAN MINE (Gold)

Baker County—Mormon Basin District

The Zenith Gold Mining Co., Roy Chadwell, agent, Durkee, Oregon, operates the Regan Mine.

It is 18 miles southwest from shipping point, Durkee. Mine was first located 35 years ago in Lost Basin and was known as the Reagan Mine. Consists of 12 lode claims, recorded in Baker County. In high mountain area; country rock is diorite and serpentine; vein strata bearing northeast and southwest; width 2½ feet. Mineral is gold. Water from tunnel; power from 50-h.p. gas engine. Has a 5-stamp mill, 2 ore cars, concentrating table, and light mining tools. There are 2,000 feet of tunnels, shaft 250 feet. This property was operated all summer of 1938 but was not visited.

Informant: Prescott, 37.

#### SUMMIT MINE (Gold)

Baker County—Mormon Basin District

Owners: In partnership—Carl Mathes, Andy Porter, A. A. Fidler, W. E. Buell, F. H. Dye. Miss Louise Lenard of Chicago is part owner.

Operator: Carl Mathes.

Location: NW. ¼ of sec. 22, T. 13 S., R. 42 E.

Area: Four claims and two fractions—all unpatented lode claims.

History: Relocated in 1908. Present owner since 1936. Production small, operation continuing in 1938.

Equipment: Mill consists of primary laboratory-size crusher, Ellis type ball mill, 30 mesh screen, 4 by 10-foot copper amalgamation plates, 5-foot box of 1-foot wide riffles. Power is furnished by Ford engine with governor. Capacity is ½ ton per hour; if ore is soft, sometimes more.

Geology: Country rock is greenstone intruded by granodiorite and by andesite dikes—all highly faulted and somewhat sheared. The main vein runs northeast and southwest. There is a large post-mineral east-west fault which dips 25 to 30 degrees S., above which no ore is found. Below this fault, ore appears from 1 foot to 5 feet in thickness. The granodiorite contact appears 30 feet south of the workings in No. 2 level and not far south of the lower tunnels.

The ore is composed of oxidized sugar quartz mixed with decomposed andesite, fragments of solid quartz, all heavily iron stained. In a few places there is very fine galena and pyrite visible. The ore averages from \$10 to \$20 per ton and is free milling. The ore bodies are very irregular, being repeatedly cut off by steep cross faults.

Miscellaneous: There are 4 or 5 feet of snow in the winter; abundant water near mill all the year around; abundant timber. Power line comes within ¼ mile.

Informant: Carl Mathes through J. E. A., 38.

#### SUNDAY HILL MINE (Gold)

Baker County—Mormon Basin District

Owners: William Phalen, Frank Harris, John Daniels, Rainbow Company, and Bonekamp estate.

Location: In SW. ¼ of the NW. ¼ of sec. 15, T. 13 S., R. 42 E. Elevation about 5,050 feet.

Area: 17 lode claims.

History: Located in 1867 and first mill built in 1868. Said to have a past production of \$80,000. Within recent years, W. H. Bonekamp is said to have taken out \$6,000 in 1933, and Holman \$5,000 in 1931 and 1932. The North America Mines, Boston, did development work in 1937 to the extent of 30 feet of shaft and 200 feet of drift.

Equipment: The mine equipment consists of three ore cars, 3 hoist buckets, 2,000 feet of track, 5 h. p. motor for hoist and 30 h. p. motor for compressor, 800 feet of 4-inch pipe. The mill consists of power line and transformers, 18-inch crusher and automatic feeder, 50-foot and 25-foot feeder belts, 50 ton ball mill and "G. E." 40 h. p. motor,

Dorr type classifier, Adams reagent feeder, 1 primary and 3 secondary flotation cells, with "U. S." 1½ h. p. motors for each, Wilfley table, 5 by 20 feet, with "F. M." 7½ h. p. motor, 2 7 by 10-foot amalgamation tables, 2 4 by 4-foot box dryers. Line shafting, pulleys, 2-inch and 3-inch piping, switch boxes, etc. Laboratory fitted with 500 gram test flotation cell (Fagergren), 5 12-inch screens, Troemer double bar scales (700 gm.). The large mill building and transformer building are in good condition, and there are three bunk houses and cabins.

"Geology: The country rock consists of quartz-mica schist, striking N. 30 to 70 degrees W. and dipping 45 to 70 degrees N. Numerous dikes of quartz diorite and related rocks are present in the mine, and a few basaltic dikes occur.

"Quartz stringers are numerous, and one strong vein, the Phalen, has been opened for 230 feet. On the east, the Phalen vein, which strikes N. 40 to 50 degrees W. and dips 50 degrees N., is cut off on the 200 level by a normal fault, called the Roberts fault, striking N. 50 to 60 degrees E. and dipping 50 to 60 degrees SE. This fault is also exposed on the 150 level and in the incline between the 150 and 100 levels. On the 100 level the down-thrown segments of the Phalen vein have been followed for about 60 feet from the Roberts fault. The segment of the Phalen vein in the footwall of the Roberts fault on the 200 level ranges from a few inches to 5 feet in thickness but finally pinches out on the west into a few minor quartz stringers and some gouge. The vein is accompanied

by gouge almost throughout its length, especially on the hanging wall. The quartz itself is considerably brecciated. In the area regarded as minable the vein averages about 2½ feet thick.

"The Noon vein consists of about 3 inches to 1 foot of quartz and gouge. It appears to be a hanging-wall fissure branching from the Phalen vein. Where exposed, it is near or along the contact of quartz-mica schist and a dike of fine-grained diorite. A few other veins, the Kendall and the King especially, have been exposed, but very little work has been done on them. In several places, especially in the King crosscut, the country rock, both schist and diorite, has been intensely silicified and impregnated with pyrite. It is reported to carry gold, averaging between \$10 and \$11 a ton.

"The vein material consists chiefly of quartz and gouge. Some ankerite is present and considerable green mica, which is locally called roscoelite but actually is fuchsite, as determined by W. T. Schaller. Some sericite also occurs. Pyrite is the commonest sulphide, but arsenopyrite, galena, and sphalerite are also present. Galena is regarded as a sign of especial richness in gold. Some of the gold occurs free from visible sulphides and is free milling.

"The ore is very spotty in tenor. According to the assay map of the company there are considerable areas of ore averaging more than \$10 to the ton in gold. Some individual samples run above \$50 to the ton."

Ref. Gilluly, Reed, & Park, 33:19 (quoted)

Informant: J. E. A.

## ROCK CREEK AREA

(Elkhorn and Rock Creek Districts)

### Geography:

Although approached by somewhat different routes, the Rock Creek and Elkhorn Districts may be considered together. The Baisley-Elkhorn, Maxwell, and Highland mines are on roughly parallel fissures along the southern edge of the Bald Mountain batholith. A number of other veins extend westerly from the Highland mine to the Mountain View mine at the northeasterly end of the Cracker Creek District.

The Rock Creek area includes the east slopes and drainage of the Elkhorn range from Anthony Creek on the north to Goodrich Creek on the south.

It is bounded on the south and east by the Baker, on the southwest and west by the Cracker Creek Districts, and on the west and north by the county line.

### Geology:

The veins are on or close to the contact between quartz diorite and argillite. Some are in the diorite, some in the argillite, and others cross the contact. Mineralization is characteristic of the inner zone of Hewett's classification; consequently, the ratio of concentration is low—usually between 5:1 and 10:1. Sulphide mineralization is chiefly pyrite, galena, sphalerite, and chalcopyrite, with some



tetrahedrite. The percentage of free gold recoverable by amalgamation is low.

### History:

The mines are in the high mountains at the heads of Rock Creek and Pine Creek. Most veins are reached via Rock Creek, but the Baisley-Elkhorn is reached only by road up Pine Creek. The principal mine camps are between 6,000 and 6,500 feet above sea level. The veins outcrop at much higher elevations.

The Baisley-Elkhorn, Highland, and Maxwell have, so far, been the only important producing mines in this district. Together they have produced between 1 and 1½ million dollars in gold and silver. Nearly a million dollars was produced by the Baisley-Elkhorn alone. The district was discovered in the 1880's, and was actively productive in the late 1890's and early in the present century. Since 1914 there had been no important production until the Highland was reopened in 1935. In 1936, exploration work was in progress at the Baisley-Elkhorn, while the Highland-Maxwell group was milling about 50 tons of ore a day.

The mountains are heavily timbered and water is plentiful. Power lines of the Eastern Oregon Light & Power Co. pass through the district.

### AFTERTHOUGHT CLAIMS (Gold, Lead, Zinc) Rock Creek District

Record-Courier newspaper of Baker, Oregon, Sept. 29, 1938, states:

"Haines—George Irvin, Aaron Barker and Frank D. Baird have been continuing development work on the Afterthought and Galena claims on North Powder River above Bulger hill and have given an option to Mr. B. A. Hanks of Grant County who is expected to begin survey work and further development. The mine is one of the few prospects in this area and the gold values are carried in a galena-zinc ore, Mr. Irvin states."

### BAISLEY-ELKHORN (Gold) Rock Creek District

Owners: John Schmidt and Pollman Estate, Baker, Oregon.

Area: 9 patented, 5 unpatented quartz claims.

"The Baisley-Elkhorn mine is near the head of Pine Creek, about 15 miles by road from Baker. The last 4 miles of the road from Baker to the

mine are steep mountain grade, while the other 11 miles are in the Powder River Valley.

"The vein is partly in quartz diorite and partly in argillite. Early operations were chiefly in the diorite. It is said that two ore shoots were worked. One ore shoot was said to have been about 150 feet long, the other 850 feet long. The maximum width of the vein was said to have been about 10 feet, the average width about 2 feet. So far as could be learned, the average value of the run-of-mine ore was between \$10 and \$20 a ton. Lindgren (01:646) describes the ore as a "soft mixture of coarse sulphides with crushed diorite and occasional streaks of barren quartz."

"Recent operations conducted by the owners have cut the vein several hundred feet northeast of the old workings and about 200 feet below the bottom of the old shaft. A narrow but very persistent vein of highly mineralized quartz has been followed for several hundred feet along intersecting fractures or joints in argillite." (Lorain)

"Development: About 10,000 feet of work. Principal work is crosscut 2,300 feet to vein and 1,000 feet drift on vein zone 950 feet below outcrop.

"Relationships: Vein in quartz diorite close to contact with argillite. Strike N. 60 degrees E., dip 85 degrees NW. Quartz, pyrite, blende, chalcopyrite, calcite.

"Milling and Production: Concentration ratio from 5:1 to 7:1. Gold 20 to 25 per cent free. Production estimated at \$950,000.

"The Baisley-Elkhorn mine explores one principal vein, largely in quartz diorite, and several subsidiary parallel veins. As exposed on the lowest tunnel, 950 feet below the outcrop, the vein contains one or two strands of quartz 6 to 12 inches wide, containing coarse sulfides in the midst of quartz diorite gouge. A polished specimen reveals the following order of deposition: coarse pyrite, quartz, blende and galena. No distinct epoch of crushing is shown." (Hewett)

Property equipped with water wheel, compressor drills, etc. In August, 1938, press reports state that shipping ore was being mined from the upper workings by Cox Brothers.

Ref. Lorain, 38:25 (quoted)  
Hewett, 31:8, 10, 13 (quoted)  
Lindgren, 01:646  
Swartley, 14:161  
Pardee & Hewett, 14:74  
Parks & Swartley, 16:20

**BULL OF THE WOODS MINE (Gold)**

Rock Creek District

Owners: Walter Coles and John Long, Haines, Oregon.

One unpatented claim 15 miles SW. of Haines, country rock argillite and granite; vein strikes NE.-SW.; width 25 feet; low-grade ore; high elevation; 70-foot tunnel; not visited.

Informant: Prescott.

**CHLORIDE MINE (Silver, Gold, Lead, Copper)**

Rock Creek District

Owners: Chloride Consolidated Mines; G. H. Ash estate, Hamilton National Bank Building, Nashville, Tennessee. Under bond and lease to F. A. Holt. (Press reports state that W. A. Boyes has taken an interest in the lease with Holt.)

Location: Along the north edge of sec. 24, lapping over into 13, T. 8 S., R. 37 E., elevation 5,500 to 6,000 feet.

Area: Three claims, patented (two lode and one mill site) and one fraction.

History: The property is an old one, and it is said that there have been two mills on it, both of which were destroyed by snowslides.

Equipment: Ore car and 250 feet of track in No. 2 tunnel.

Geology: The claims lie just south of the east-west contact which parallels Rock Creek on the north. The workings are predominantly in argillite, with the granodiorite to the north. Andesite dikes are also present, but apparently as a part of the argillite series and not connected with the mineralization. The ore showed galena 15 per cent, arsenopyrite 3 per cent, pyrite, chalcopyrite, argentite 2 per cent, rest quartz. Numerous small xenoliths of grey argillite included within the quartz. Possibly some tetrahedrite. Pyrite crystals rounded and embayed. Open vugs in quartz.

The central tunnel runs into a well-defined vein striking about N. 45 degrees to 50 degrees E. and dipping 55 to 75 degrees S. This vein is drifted for about 400 feet, one winze of 30 feet and stoping for 30 feet at the end. The country rock is argillite. The walls, especially the hanging are smooth, the slicks raking to the east about 80 degrees.

The lower tunnel has a total of about 1,000 feet open at the present time. There are numerous barren coarse quartz and calcite veins. From the size of the dump little or no ore seems to have been

mined, although the foundation of a mill remains nearby.

Climate: The climate is quite rigorous, with rather heavy snowfall. Timber, water, electric power are available within short distances.

Informant: F. A. Holt through J. E. A.

Ref. Lindgren, 01:648

**COPPERDOWN MINE (Gold, Silver)**

Rock Creek District

Owner: John Deaman estate, Manley Strayer, Administrator.

This mine is 16 miles northwest from shipping point, Baker, on the Union Pacific and Old Oregon Trail. Located many years ago and consists of 3 unpatented lode claims, recorded in Baker County. In a high mountain area; country rock is granite and argillite; vein strata bearing northeast and southwest, width 4 feet. Water is ample; power can be purchased from the Eastern Oregon Light and Power Company nearby. Mine is now idle. Good cabin, shop and hand-mining tools on the ground.

Informant: Prescott, 37

**CUB MINE (Gold)**

Rock Creek District

Old name: Black Bear Mine.

Present owner: Irvin Brothers, Baker, Oregon.

Location:  $\frac{3}{4}$  mile above Delay Cabin in Phillips Gulch, NW. of Baker on Elkhorn Ridge. 1 claim at present. Expect to locate 5 in addition, spring of 1938.

History: John Deerman, original locator, about 20 years ago. Relocated in January 1938 by three Irvin Brothers. No production of record but is said to have had 1 or 2 small high-grade pockets.

Geology: Steep canyon topography, country rock apparently all granodiorite for a considerable area. Elevation 4,500 feet. Plenty of timber for ordinary use. Water lacking except in spring and early summer. Winter snows 3 feet to 5 feet. Somewhat isolated, although road, which needs repairing, runs within  $\frac{3}{4}$  mile of tunnel. Vein in granodiorite. Much crushed and sericitized granitic filling with small quartz kidneys and lens-streaks. Some mixed granular sulphide pockets where presumably the high gold values are secured. Calcitic filling in minute cracks in quartz. Vein is 6 inches to 2 $\frac{1}{2}$  feet in width in interval of 60 feet. Strike of vein S. 22 W., N. 22 E. Dip 55 degrees westerly. High-grade values in gold con-

tent have been reported, but assays may have been from "grab" samples.

Owners claim the vein outcrops a long distance, and intend to continue development.

Informant: A. V. Quine, 38.

DOLCOATTE MINE (Gold, Silver)  
Rock Creek District

Owner: Mose Fuchs, Baker, Oregon.

This mine is 14 miles northwest from shipping point, Baker. It consists of one patented claim located in 1886 by the owner. Located in a high mountain area; country rock is granite and argillite; vein bearing northeast and southwest, width 4 feet. Water is ample; power can be had from the Eastern Oregon Light & Power Co. Mine is idle, no equipment. Has 150 feet of tunnels. Joins Baisley mine on the northeast.

Informant: Prescott, 37

HIGHLAND-MAXWELL MINE (Gold, Silver,  
Lead)  
Rock Creek District

Operator: Claire D. Schlemmer, Baker, Oregon (owner).

Location: In the Rock Creek mining district, on the northeast slope of the Elkhorn Mountains, about 15 miles airline W.N.W. from Baker. The camp, mill, and main adit (4th level) are on the east fork of Rock Creek, an easterly flowing tributary of Powder River, at an elevation of 6,100 feet, in sec. 19, T. 8 S., R. 38 E. About 2,500 feet above Haines, the shipping point on the U. P., which is 14 miles distant by fair valley and mountain road, all down grade. The contract cost of trucking the concentrates is \$1.75 per ton, or 12½ cents per ton-mile.

(Quotations in this report are from a report by F. E. Calkins, 209 Tabor Bldg., Wallace, Idaho, October 5, 1937, which was made to secure data for presentation to the S.E.C. All the data quoted has been checked by Mr. Schlemmer as to accuracy.)

Acreege of holdings: "The property comprises two contiguous mines, the Highland and the Maxwell, on the same vein, and consists of 21 mining claims and millsite as follows:

Highland: 12 patented claims, 187 acres; Mill-site, 1 claim of 5 acres.

Maxwell: 8 patented claims, 132 acres; 1 unpatented claim of 20 acres."

History: "The claims were first located in 1891 and development began about 1900. They were

worked intermittently by various operators including Highland Gold Mines Company and National Mines Company until 1921. Records of production up to that year are very incomplete, but estimates contained in old reports are \$375,000 for the Highland and \$100,000 for the Maxwell, total \$475,000 mostly in gold but with some silver and are probably somewhere near correct.

"The Highland production was all from above No. 4 tunnel level, the lowest level, and principally from sulphide ore, which was concentrated before shipping to the smelter. The Maxwell production is said to have been mostly from free milling gold ore near the surface.

"The mine was idle from 1921 to July 1, 1935, at which time Mr. Claire D. Schlemmer, the present operator, began work under option to purchase and has continued steadily up to present date.

"The equipment was reconditioned, No. 4 tunnel level reopened and extended, new ore shoots discovered, and the old 100-ton flotation mill repaired and remodeled; and milling of the ore started in April, 1936.

"Much experimental work was done, and mill recovery was increased from less than 75 per cent of the gross value in the beginning to an average of 95 per cent for the last six months and over 95 per cent for the last two months." (Since Sept., 1937, the average has been 96 per cent.)

History of Production: During the period of 17 months from the time the mill was reopened to September 1, 1937, the time Calkins report was made the production was 5,400 tons of ore averaging 0.42 ounces of gold, and 3.65 ounces of silver, of a gross value of \$79,380 gold and \$15,120 silver, total \$94,500, figures at prices of gold \$35, and silver 77 cents per ounce.

"The net smelter returns on concentrates from this ore was \$65,050, of which \$38,700 was produced in the last six months of the period from N. 3,500 ore shoot at a profit of about \$7,000."

"Profits have necessarily been small because of the low rate of production, about 10 tons per day, with consequent high overhead cost per ton; and also because much of the ore was mined through winzes and hoisted. Limited capital has prevented the doing of enough preliminary development work to open up a sufficient horizontal area of ore backs for an economic rate of produc-

tion, which at this mine would be about 50 tons per day."

In the 7 months since September 1, 1937, the mill has operated less than 100 hours per month, milling a total of 1,636 tons of ore with an average concentrating ratio of about 7.5 to 1. The values per ton for this period averaged \$22.66, of which a 95.9 per cent recovery was made. During October a recovery of 98.7 per cent was attained.

During this same period, an average shipment of concentrates (although the values varied within wide limits) contained approximately the following values:

Pb%	Zn%	As%	Cu%	Oz. Au	Oz. Ag
3.30	3.40	2.27	.96	3.09	16.09

Development: The Highland-Maxwell vein has been explored and partly developed, mostly to only a few feet vertical depth, for over a mile along its strike, by numerous tunnels. The maximum vertical depth attained by the lowest tunnel is 1,300 feet, (June 1, 1938) at the east end under the west slope of the north-branching ridge that separates this mine from the Baisley-Elkhorn to the east.

Nearly all the workings, except the lowest or No. 4 tunnel level are now caved and inaccessible.

Following is a list of the development work done by the present operators:

	Drifts	X-cuts	Raises	Winzes	Total
West end ....	420	50	195	0	665
East end .....	1,040	427	220	136	1,823
Totals ....	1,460	477	415	136	2,488

Since September 1, 1937, the following work has been done:

East end .....	600	120	0	50	770
Totals ....	2,060	597	415	186	3,258

The development work done by the present operator thus totals about 3,258 feet, of which the 665 feet at the west end of the No. 4 level was without favorable result. The east end of this adit, with 2,693 feet of work, developed about 7,400 tons of ore, with an average gross value of nearly \$22 per ton, which have been mined and milled and upon which smelter returns from concentrates average \$13.50 per ton of ore.

Recent diamond drill holes below the No. 4 level have led to the sinking of a 50-foot winze and lower level. Mining at the present time (June 1,

1938) is going forward in the 2,300 and 2,400 ore shoots at a level 50 feet below the No. 4 level.

Up to September 1, 1937, the estimated tons per foot of development on the main vein in the east workings was about 3 tons. This does not include the west workings nor a 383-foot crosscut to the north into the granite. (Since Sept., 2.1 tons per foot.)

General description: The topography is steep and rugged, with millsite over 1,000 feet above the level of Rock Creek. The vein crosses the north-flowing gulch and the ridge to the east, 1,500 feet above the millsite. Of the four old millsites still visible, the present one is the lowest. The large old mill building has been partitioned off for better heating, and only the lower portion is in use. The ore is brought out of the No. 4 tunnel into a large shed containing timber working, stable for the mules, change rooms and blacksmith shop. From here a long shed runs out over the waste dump, and another carries the tracks about 500 feet to the mill. All tracks are enclosed for year round operation under the heavy snows. Nearby are the assay laboratory and office, as well as the bunk houses and dining room.

The Highland-Maxwell vein parallels the granodiorite contact, which lies about 300 feet to the north. The country rock is in argillite, varying from carbonaceous to siliceous.

Timber is plentiful although continued operation in the vicinity has cut it back for several hundred yards in all directions.

Power is obtained from the E. O. L. and P. line, 3,000 feet distant in Rock Creek.

Wages are \$4 per 8-hour day for muckers and \$4.50 for miners. Twenty-five men are now employed.

Geology, general and local: The western part of the vein strikes almost east-west, but the trend changes until in the easternmost workings the strike is N. 55 degrees E. The dip is nearly vertical, but the ore shoots occur when it is dipping steeply to the north. The shoots are from less than 100 to nearly 1,000 feet long. The ore is seldom more than 3 feet thick with attendant gangue and crushed vein material not over 25 feet thick. The vein is entirely within the argillite, since the granodiorite contact lies at least 400 feet to the north on the No. 4 level. Several narrow dikes of aplitic or alaskitic material cross the vein. They seem

to be offset by the movement of the vein a distance of about 350 feet, which bears out other evidences of considerable post-mineral faulting, south side to the east.

The ore consists of pyrite and galena with less amounts of sphalerite, and traces of chalcopyrite, arsenopyrite and tetrahedrite. The highest values seem to be found in the fine-grained sulphides, some of which run as high as \$420 per ton in gold and silver, which will pass a 100 mesh screen. The more coarsely crystalline sulphides are lower in value.

The gangue material consists of siliceous argillite in various stages of comminution and brecciation of quartz, and the above mentioned alaskitic dikes which sometime contain disseminated pyrites. There has been much post-mineral movement as pyritic slickensides and large clean surfaces attest. The ore is primary lying well below the water table in the No. 4 level.

Inf.: C. D. Schlemmer, through J. E. A.

Ref. Lindgren, 01:648  
Swartley, 14:161  
Pardee & Hewett, 14:77, 78  
Parks & Swartley, 16:121, 150  
Hewett, 31:3, 10, 13, 15  
Lorain, 38:24

The mine was closed down in September, 1938.

#### KELLY MINE (Gold, Silver, Lead, Copper) Rock Creek District

Owners: Mrs. Mary G. Kelly, daughter and two sons, Baker, Oregon.

Area: 5 unpatented claims.

"This property is located on the north side of the west fork of Rock Creek, in sections 15 or 16, T. 8 S., R. 37 E., at an elevation of about 8,000 feet. The vein, which is of the usual Cracker Creek type, is in argillite; but the granodiorite contact is only about ¼ mile to the north. The strike of the vein varies between N. 60 degrees E. and N. 85 degrees E., the dip is about 70 degrees N. The ore minerals are zinc blende, pyrite, galena and a copper mineral which may be tetrahedrite. The development work consists of 4 tunnels with a depth from the top of the ridge of about 600 feet for the lowest one. The lower tunnel is about 600 feet long and the others are about 300 feet each. Most of the development is drifts which expose ore from a foot or two up to 10 feet or more wide.

The average value of the ore is claimed to be at least \$10."

Ref. Swartley, 14:160  
Parks & Swartley, 16:135 (quoted)

#### LeCLEAD (Copper, Gold) Union County, Rock Creek District

Owner: T. G. Montgomery, Baker, Oregon.

This mine is 7½ miles west from shipping point, North Powder, located in 1901 by Harold Parker who owned it for 23 years. It consists of 3 patented lode claims, recorded in La Grande. Located in a hilly area; country rock is greenstone; vein bearing southeast and northwest, width 2½ feet. There have been 80 tons of high grade ore shipped by an early operator. Water is ample; power is available from Eastern Oregon Light & Power Company nearby; timber from Government land 2 miles away. Mine is idle and there is no surface equipment. A 480-foot tunnel and 100-foot shaft are developed.

Informant: Prescott, 37.

#### MAGPIE MINE (Gold, Barite) Rock Creek District

Owners: Charles Dunn and others, Baker, Oregon. 3 miles from Haines. Located in 1937; 5 unpatented lode claims in hilly area; country rock is greenstone and porphyry; vein strata bearing SW. and NE., width 12 feet. Water ample from springs; power from Eastern Oregon Light & Power Co. nearby; no timber. No equipment and only surface cuts and an 18-foot shaft. In addition to gold values there is barite.

Informant: Prescott.

#### McCOLLOCH GROUP (Gold, Silver) Rock Creek District

Owners: O. O. Baisley and Frank McColloch, Baker, Oregon.

The mine is 17 miles west from Haines. It was located several years ago and consists of a group of 6 unpatented claims. In a high mountain area; country rock is granite and diorite; vein bearing northeast and southwest, width 6 feet. Water is ample; power nearby from the Eastern Oregon Light & Power Company; timber on claims. Mine is now idle, with no surface equipment. Developed with 100 feet of tunnels. Joins Baisley mine on the northwest.

Informant: Prescott, 37.

**MOLYBDENUM MINE (Molybdenum, Gold)**  
Rock Creek District

Owners: Seth Irvin and Frank Landroth, Baker, Oregon.

The mine is 14 miles west from Haines. It was located 6 years ago and consists of 6 unpatented lode claims. In a high mountain area, the country rock is granite, the vein bearing easterly and westerly; width 100 feet. Mineral is molybdenum and gold. Water is ample, power is available from the Eastern Oregon Light and Power Co. nearby. Mine is being developed in a small way; has 210 feet of tunnels.

Informant: Prescott, 37.

**PEARL MINE (Gold)**  
Rock Creek District

Owner: Isador Fuchs, Baker, Oregon.

The mine is 14 miles from Baker. It was located by owner in 1886 and consists of one patented claim, recorded in Baker county. In a high mountain area; country rock is granite and argillite; vein bearing northeast and southwest, width 4 feet. Water is ample; power from the Eastern Oregon Light & Power Co.; timber on claim. Mine is idle, and there is no surface equipment. Developed with 300 feet of tunnels.

Informant: Prescott, 37.

**STIBNITE MINE (Antimony)**  
Rock Creek District

Owner: Harold Parker, North Powder, Oregon.

Is 12 miles west from North Powder. Located 25 years ago and consists of 2 claims. Located in a high mountain area; country rock is granite; vein bearing northwest and southeast, width 2½ feet.

Informant: Prescott, 37.

**WESTERN UNION MINE (Gold, Silver, Lead)**  
Rock Creek District

Owners: John Long, Ed. Coles, Walter Coles, Haines, Oregon.

It is 15 miles from Haines. The mine was located in 1887 by Tom McArted. It consists of a group of 6 patented lode claims, and located in a high mountain area. The country rocks are argillite and granite. The vein bears northeast and southwest, with a width of 25 to 125 feet. Water ample; power from the Eastern Oregon Light and Power Co. nearby. Mine is being oper-

ated by 3 men, has camp, shop, cars, track and other mining tools. Developed with 2,000 feet of tunnels. 2 miles above Chloride.

Informant: Prescott, 37.

**WRIGHT AND VAN MEAD CLAIMS (Gold)**  
(Model, Mammoth, and Silver Tip Claims)  
Rock Creek District

Owners: Van Mead, Lockhart Rooms, Baker; and H. E. Wright, 2730 6th Street, Baker. Also operators.

Location: On north side of Rock Creek, in S. ½ sec. 13, T. 8 S., R. 37 E. W. M. Adjoining Chloride Mine on north.

Area: Three unpatented lode claims with above names.

History: Located in May, 1938. No production.

Equipment: Cabin, old Sullivan compressor, forge and blacksmithing tools, 2 air drills, steels, etc.

Miscellaneous: Located 12 miles by county and mountain road from Haines. No water except small spring nearer than Rock Creek, 100 feet lower. Snowfall 4 to 5 feet, winters rigorous. Power line adjacent.

Geology: Lower tunnels No. 1 and 2 penetrate 25 to 50 feet of medium-grained biotite-granodiorite to reach the contact of the intrusive with argillite. In the lower tunnel the contact is gradational with the chlorite-mica schist (S. 55 degrees E.—65 degrees NE.) grading out into the argillite. The argillite is usually dense and blocky and hard.

The vein strikes from N. 50 degrees to N. 65 degrees E., and dips from 70 degrees to vertical to the south. This is at an angle to the argillite banding which strikes N. 35 to 60 degrees W. vertical.

The vein in the lower tunnel is from 4 to 6 inches wide, being oxidized throughout the granodiorite and for 5 feet into the argillite. In the face it is widest, lenticular, from 3 to 10 inches wide, and almost vertical. It is composed of coarse pyrite in quartz.

In the next level 30 feet above, the vein is variable in width, 3 to 10 inches wide, and dips about 70 degrees south. In the face there appear two parallel veins, the upper 1 to 3 inches of quartz, the lower 8 to 10 inches of gouge and quartz. The ore appears as fine and coarse pyrite and tetrahedrite (?) in the quartz.

The upper tunnel (55 feet above the lower) only shows a mineralized zone from 0 to 1 inch wide and is all in argillite. It is possible that this is not on the same vein, being located too far to the south.

Tunnel No. 5 is located 1,800 feet west along the granite-argillite contact at an elevation of 6,490 feet. It is driven into a granite boss sur-

rounded by argillite, the main contact being several hundred feet to the north. Here a highly pyritiferous talc-clay gouge carries gold, no silver. The extent of the granite suggests no great continuity for the vein. The location is high on the mountain-side and rather inaccessible.

Informant: J. E. A., 38.

## SPARTA AREA

(Lower Powder River and Sparta Districts)

### Geography:

The Sparta area extends on both sides of lower Powder River from Eagle Creek west to the range line between 43 and 44 E., and includes all the drainage into Powder River from the south, from the mouth to the above range line.

### Geology:

This district is between Lower Eagle Creek and Powder River, and with the exception of its northern border is a granitic area surrounded by recent basalts. Doubtless it was once entirely covered by the Columbia River basalt since Sparta Butte, close to the town of Sparta, is an uneroded remnant of basalt. The Sparta region, no larger than 30 square miles, is a granitic stock which was intruded into the older greenstones and sediments. These older greenstones and sediments which covered this granitic stock at the time were eroded from its top. Afterwards when the great flows of Columbia River basalt spread over wide expanses in eastern Oregon they covered the Sparta region also, and erosion, with the exception of the northern border, has not fully uncovered all of the intrusion which had been uncovered previous to the first flow of this late basalt. The area has been mapped by Ross (38).

This intrusion is a light-colored rock of very coarse-grained texture, and consists chiefly of feldspar and quartz. The rock, in thin section, is seen to be composed chiefly of albite feldspar, which sometimes shows zonal growth with the central portion of the feldspar crystals more basic than the outer parts. This rock is a soda granite and the much larger quartz grains and the more basic portions of the feldspars suggest that it is a more acidic phase of the intrusion which elsewhere in eastern Oregon is almost altogether the more basic

granodiorite. Besides the granite there are outcrops of porphyry in the vicinity.

In the granitic area adjacent to Sparta are found normal fissure veins formed by the deposition of quartz coming from the cooling mass below. The same type of vein is found cutting the greenstones, but the more distant they are from the intrusive the less extensive is their mineralization.

### History:

Lidgren (01:736) states:

"A long, heavily timbered ridge follows the western side of Eagle Creek for a long distance toward Powder River. The Sparta mining district occupies the southern end of this ridge, where the rounded hills, here scantily forested, gently slope toward the arid foothills of Powder River. The elevation of Sparta is 4,200 feet. The normal granite which forms the country rock is deeply decomposed and the gulches are filled with gravel. It was found at an early date that these gulches, draining in all directions from the central hill, were auriferous, but on account of lack of water little could be done until 1873, the Sparta ditch was completed, with a capacity of 3,000 miner's inches and a length of 22 miles. This canal takes its water from the west fork of Eagle Creek and carries it down on the long ridge to Sparta. Great activity followed its completion, but in a few years the output rapidly diminished. According to the mint reports the placers produced \$35,000 in 1882, \$30,000 in 1889, \$3,100 in 1891, \$85,000 in 1892.

"The gulch placers of Sparta in most cases led up to well-defined quartz veins. Many of these were known in early days and gold was extracted by hand mortars, arrastras, and small mills. These operations were not continued, however, and the production from the veins gradually fell off; from

\$60,000 for Union county in 1880, the output was reduced to \$7,300 in 1885, \$15,000 in 1886, and \$15,000 in 1887; but in 1889 there was a most remarkable change, the output in that year rising to \$576,000. Most of this, of course, came from the Sanger mine (Eagle District) and the Cornucopia (district), but a large proportion was contributed by the quartz mines of Sparta. For the four years (1889-1892) from which complete returns are available, the following productions are compiled:

Little Pittsburg .....	\$111,000
Windsor .....	72,000
Union Tunnel Company .....	91,000
Gold Ridge Company .....	124,000
Free Thinker .....	65,000
Arkansas Belle .....	83,000
Magpie .....	19,500
New Gem .....	59,000
Del Monte .....	27,500
Buffalo .....	25,000

"As the workings deepened the country rock became harder and the general conditions more unfavorable, so that of late years the production has again been declining, and in 1900 only one mine, the Gem, was worked on a larger scale. Though the veins are narrow they are rich, and it is more than probable that thorough prospecting will develop many good mines in the vicinity. The prevalent strike of the veins is north-south or northeast-south-west; the dip is to the east or southeast. The country rock is throughout a granite, in which the biotite is usually converted to chlorite. The ore is free-milling quartz, with some sulphurets."

#### CURL CLAIMS (Gold) Sparta District

Owner: Charles W. Curl, Baker, Oregon.

Location: 300 yards east of mouth of Maiden Creek on north side of Powder River.

Area: 3 unpatented lode claims.

Development: A prospect, only location work done. 20-foot tunnel, 2 open cuts and 8-foot shaft.

Geology: This vein is similar to the one to the south on the Minnie May property (which see) and is probably a northward continuation of it. The ore is 6 to 18 inches wide in brown sheared, completely altered gabbroid rock. The main vein consists of dark quartz lenses, white quartz, and red oxide bands. Apparently there have been

several periods of quartz deposition. Vein strikes north 85 degrees east. Stands almost vertical. At the north extension it widens to 32 inches with large amounts of sugary quartz red hematite, white clay gouge in a country rock of sheared albite granite.

Informant: C. W. Curl through J. E. A., 38.

#### DIXON AND GRAVEN CLAIMS (Gold) (Minnie May) Sparta District

Owners: J. Dixon and Walter Graven, Baker, Oregon.

Location: 100 yards below mouth of Maiden Creek on the south side of Powder River near Macy Mine.

Area: 3 unpatented lode claims.

Development: 2 shafts 8 and 12 feet deep. Tunnel 60 feet long, 10 to 15 open cuts along a length of 1,200 feet.

Geology: Vein strikes north 85 degrees west dipping from 85 to 90 degrees north, varies from 4 inches to 2 feet in width, average 1 foot. It is composed of rotten, broken quartz lying in granitic rock classified by Ross as albite granite. This varies from the north end of the claim where it is very light colored to an almost black gabbro at the south end of the claim. The vein is said to pan gold for 1,200 feet and is said to assay up to \$24. Walls are well-defined, ore often sugary and soft with some lime and iron oxide veinlets. There are patches of bluish quartz and considerable white gouge. The vein is quite continuous but narrow, the ore completely oxidized.

Miscellaneous: No timber. Water and river below. Highway within 200 yards accessible all year around.

Informant: C. W. Curl through J. E. A., 38.

#### GEM OF SPARTA MINE (Gold) Sparta District

Owners: Gem Mines, Inc., 935 Broadway, Tacoma, Washington. H. C. Kloppenstein, Pres.; C. L. Anderson, operator.

Location: Sections 17 and 20, T. 8 S., R. 44 E.

Area: 10 unpatented claims and fraction.

History: The Gem mine, located 2 miles west of Sparta, was worked in early days, a 10-stamp mill being erected in 1873. Two years afterwards the mill was removed to Connor Creek, and the mine was idle for a long time.



Geology: Main vein strikes N. and dips 40 degrees E., lying in albite granite (with some aplite) in a zone 50 feet wide in which occur several small quartz veins. The fault systems offset the vein several times to the west about 50 feet on the south side. Minerals include free gold, pyrite, and sphalerite.

"The old workings followed the vein to a depth of 100 feet or more on the dip. The new developments consist of a vertical shaft 179 feet deep, with drifts extending 150 to 200 feet from two levels. The vein shows sharply defined foot and hanging walls from 1 to 4 feet apart, between which lie crushed granite and streaks of quartz in some places 2 feet in width. The ore is normal coarse vein quartz, with free gold and a little pyrite and black zinc blende. Near the shaft the vein cuts a dike of granite-porphry without changing, but on the second level south it is squarely cut off by a basalt dike striking east-west and dipping 50 degrees S., along which some faulting has also taken place. The vein will in all probability be found to continue, as before beyond the dike." (Lindgren.)

The east prospect of the old working is on a small discontinuous stringer which is rather badly faulted and from assays made by Mr. Motz carries negligible values. This stringer lies more or less parallel to the main vein workings (or north 10 to 25 degrees east). It also is rather badly faulted and would be hard to follow any distance.

Equipment: Track, cars, small hoist, etc.

Hoist House:

140 h. p. Atlas Imperial diesel.

18 by 16, 11 by 16 two-stage Ingersoll-Rand Air Compressor.

15-foot air receiver.

Hoist winch run by air.

Mill House:

90 h. p. Atlas Imperial diesel.

Dodge Type 12-inch crusher.

2 automatic disk feeders.

5-stamp batteries and amalgamation plates.

34 by 50-foot Marcy type rod mill operated with balls.

4 cell flotation.

2 Wilfley tables.

Switch boards, 12 k.w. lighting generator. Blacksmith shop and large boarding and rooming house.

Miscellaneous: Timber scanty, Sanger ditch runs through property but water must be trucked in. Well dry. Snowfall averages 2 to 8 feet.

Informant: C. L. Anderson through J. E. A., 38.

Ref. Lindgren, 01:737 (quoted)  
Swartley, 14:127  
Parks & Swartley, 16:98  
Gilluly, Reed, & Park, 33:58  
Lorain, 38:33

### MACY MINE (Gold)

Sparta District

Operators: Maiden Creek Gold Mines Co., Box 699, Baker, Oregon. George V. Whittle, Lessor-operator, Smith Tower, Seattle, Washington.

Location: Sec. 3, T. 9 S., R. 44 E., 35 miles from Baker along Baker-Halfway Highway. 1,400 feet up Maiden Creek from Powder River.

Area: 7 overlapping claims (120 acres).

History: Macy opened it up 15 years ago. Used arrastra producing \$3,000. Short operation prior to present operation. Loyal Young developed tunnel (upper) and part of lower workings. Whittle started May, 1937. He has spent about \$10,000 to date. Production prior to present \$15,000 to \$20,000 plus \$3,000 from arrastra. Present production \$1,000 in bullion (1937). Mill concentrates value \$100 to \$150 per ton. Have not been shipped as yet.

Equipment: All underground work contracted except air and working tools and machines. Elevation 2,500 feet at lower tunnel. 1 mill building, 1 boarding house, 1 four-man bunk house, 3 two-man bunk houses, 1 150 gal./hr. Gould pump—water secured from Maiden Creek at present. Power direct connected 25 h. p. upright FM diesel for mill—one 50 h. p. FM diesel for compressor, camp light system generated.

Geology: Canyon topography. Country rocks are mixed flows, cut by diorite dike flows standing at steep angles—bedding planes strike N. 12 degrees W.—72 degrees NE. Vein drifts trend N.-S. cutting across bedding at acute angle. Flows are of mixed andesites, diorites and gabbros. Portal is in and through granodiorite dike—easily decomposed as noted on surface. Blocky ground with quartz seams of no value in joints. Breast of main drift has just entered argillite. Much carbonaceous material noted in gougy portions of vein north of argillite contact denoting movement from that direction. Argillite contact hazy but shows same general strike as bedding. Vein varies in dip 45 degrees

to 65 degrees carrying white quartz with calcite and secondary cubic crystals of pyrite.

**Metallurgy:** Soft and mainly free milling—ore from winze apparently contains more pyritic sulfides. No direct shipping. No constant tonnage—present mill is using all muck from winze sinking claimed to run \$10 per ton.

**Development:** Upper tunnel in a cross vein—200 feet of crosscut and 120 feet of drifting, small amount of stoping. Lower level—530 feet drift plus 130 feet lateral crosscutting; 120 feet drifting; 150 feet winding raise; 60 to 70 feet drift at this level; cross winze on main level—50 feet deep—which is point of present development.

**Informant:** A. V. Q., 37.

**Ref.** Gilluly, Reed, & Park, 33:59

Later reports indicate that the lessor had sublet the property to Lloyd Anderson and Kenneth Grabner, with W. C. Fellows as director-engineer. They are milling 75 to 100 tons per week and had shipped a 143-ounce gold brick from 67 tons in one week's operation. Ore values had doubled over previous operations. The average value of the ore is said to be \$40 per ton and a recovery of 92 per cent is made. Robert Donald, Baker, sublet the property in November, 1938, and after production of about \$6,000 closed the mine in April, 1939.

**Informant:** J. E. A., 39.

**NEW DEAL MINING CO. (Gold)**  
Sparta District

Oregon corporation; capitalization, \$50,000. L. E. Boyer, Halfway, Oregon, Pres.; H. E. Hall, Richland, Oregon, Secy.-Treas.

**Location:** Gold Ridge Mining Claims, the Speckelmeier property and some deeded land about ½ mile northeast of Sparta, Oregon. This prop-

erty consists of several patented claims and several acres of deeded land. About 200 acres in all.

“Within sight of the Sparta Post Office, the New Deal Mining Co., L. E. Boyer, Manager, was developing a vein not hitherto developed except by shallow surface workings.

“A single compartment winze had been sunk 140 feet on the dip of the vein and drifts were driven 60 feet each way on the 100-foot level.

“The ore consists of quartz lenses and stringers, with gouge and granite breccia, between granite walls about 4 feet apart. The quartz varies from a few inches to four feet wide; it has been continuous in varying widths and values for the depth of the shaft. Assays were said to have averaged \$20 a ton in gold. The vein strikes N. 30 degrees W. and dips 40 degrees E.

“Northwest of the shaft the vein is broken up by cross-fracturing. About 200 feet southeast is an old prospect shaft with good ore on the dump. Several hundred feet farther southeast, on the strike of the vein, are the strong quartz outcrops of ‘Gold Ridge’. These outcrops are nearly continuous for several hundred feet. Between 1889 and 1892 a recorded production of \$124,000 was obtained from surface workings on Gold Ridge.

“The mine was equipped with a small gasoline-driven hoist, compressor, mining equipment, and a boarding house. A bunkhouse was in course of construction.

“The winze was said to have been sunk at an over-all cost of \$10 a foot. No appreciable water had yet been encountered.”

Press reports state that the mine had been sold to the Hi-Grade Mining Co. of Cornucopia, Oregon. October 12, 1938.

**Ref.** Lorain, 38:34 (quoted)

## SUMPTER AREA

### Geography:

The Sumpter Area includes the drainage of upper Powder river above Hershall (near Union and Dean creeks), with the exception of the Cracker creek area, whose southern east-west boundary lies three miles north of Sumpter. It thus takes in practically all of Sumpter valley. A short distance below the mouth of Deer creek the Powder river enters a narrow canyon in which

it flows for about 12 miles. The Sumpter valley, which is above the canyon, is at an elevation of from 4,000 to 4,500 feet and is an alluvial bottom flanked by broad gently sloping forested benches. Beyond these the snowy summits of the Elkhorn range rise abruptly eastward, while to the west a well-timbered ridge of moderate elevation separates the valley from Burnt river drainage. A little above Sumpter the Powder river branches into

Cracker creek, McCully fork and several other smaller creeks, all heading among the high ridges leading to Elkhorn range or Mt. Baldy.

### Geology:

Argillites in great variety outcrop over most of this area. Although the main branches of the streams rise in granodiorite areas, the only outcrops of granodiorite within the district are of small extent; one on the divide between Sumpter and Granite, about half of which is in Baker county, a very small outcrop at the head of Lake creek, a branch of Deer creek, and several small irregular outcrops on the divide between Powder river and Burnt river on the south side of Sumpter valley. Some small outcrops of limestone as well as occasional bodies of greenstone are found within the argillite areas, and granodiorite porphyry and aplite dikes occur in the vicinity of the granodiorite, since the latter is an intrusive into the argillite.

The general course of Powder river was evidently laid out before the outpouring of the basalt which covers much of the territory to the south of the district. It is evident that these basaltic flows dammed the river to a height of 4,600 to 4,700 feet and that this barrier created Sumpter valley. Coarse gravels at once began accumulating and filled the valley to an elevation of 4,600 feet and these ancient gravels can now be seen on the older rocks for a maximum width of nearly 6 miles and a length of about 15 miles. As the lava barrier was gradually cut through, the gravels were left in terraces in the valley. At the present time the stream has cut down 700 feet below the top of the lava flows.

There is a small area of lava still remaining upon the divide between Buck gulch and Burnt river valley. Underneath this lava flow is a buried stream channel. This buried 3-mile remnant of a former drainage system apparently forked a short distance above Sumpter. The destruction of most of this stream probably contributed more gold to the placer mines than the erosion of veins by the present drainage system.

Workable placer grounds do not extend very far up Cracker creek from Sumpter since most of the area north was formerly occupied by glaciers. To the west there was much placer mining in former days, particularly at the Weaver mine and

on benches above and below the town of Sumpter. The greatest area is below the town where on the valley floor the dredges are working a wide field. Several of the smaller creeks which empty into Deer creek contain placer gold.

### History:

The placer deposits were discovered in 1862 and have been worked more or less actively since that time. The first dredge (9 cubic foot buckets) was constructed during 1912 and began operating January 7, 1913, and a second dredge (7½ cubic foot) was constructed in 1914. With some interruptions, dredging has continued up to the present time (1939). There is now operating a 9 cubic foot dredge which washed 3⅓ million cubic yards of gravel in 1938, with a probable life of eight additional years. Dragline dredges are also operating in the area.

#### BUCK GULCH MINE (Placer) Sumpter District

"This mine is owned by Fred Gowing, A. I. Snyder and associates, of Oakland, California, and located in Buck gulch, a small tributary which drains into McCully fork, a branch of Powder river, about 4 miles by road from Sumpter. The property is located in sec. 26, T. 9 S., R. 36 E., at an elevation of about 5,300 feet.

"This placer deposit is an old buried stream channel extending southwest beneath the low range which separates the Powder river drainage from that of the North fork of Burnt river. It is supposed to extend underneath this ridge for about three miles and its maximum depth below the apex of the ridge is about 600 feet. One end of this three-mile remnant of the ancient river system is exposed in Buck Gulch and the owners of this mine have driven a 900-foot tunnel through the rim to bedrock to enable them to prospect the gravels thoroughly. Enough of this work has been done in a series of drifts and raises to prove the existence of sufficient yardage of high grade gravel to warrant the bringing of water to the property and the equipping of a good sized plant to wash the gravels. Electric power for the washing plant is being brought from the Sumpter Water and Light Company's plant at Sumpter and a dam is being built across the gulch above the mine to create a reservoir, which will be filled by a 7-mile ditch with water taken from McCully fork."

Press reports (May, 1938) state that the property is now owned by E. W. Davidhizer, Mosier, Oregon, and has operated the mine each season for several years.

Ref. Parks & Swartley, 16:45 (quoted)

#### CONSUELO OREGON MINES

Sumpter District

This dragline dredge with Max Hoffman in charge began operating on Cracker creek above Sumpter in May, 1938, upon lands purchased from W. C. Calder, Baker, Oregon. Closed down during winter 1938-9.

#### ENGLAND AND HILLIARD PLACER

Sumpter District

The Mining Journal, (Phoenix, Arizona), July 15, 1938: "The dredge of the H. F. England and Company which was recently moved from Boise Basin in Idaho is now in operation on the Mack estate property in lower Sumpter valley about 18 miles from Baker, in Baker county, Oregon. This is the ground which was recently optioned and tested by N. M. Gibson of Palo Alto, California, who is at La Grande, Oregon, at the present time. The equipment will handle from 2,500 to 3,000 yards of material daily."

This plant was moved to Dixie creek in Grant county, after an operation of only a few weeks, in September, 1938.

#### FLYING CLOUD MINE (Gold)

Sumpter District

Location: In the extreme northwestern part of Baker county, North Powder district, sec. 5 (probably) T. 8 S., R. 37 E. It is reached by the way of Sumpter.

History: Up to 1931 there had been no reported production.

Geology: The deposit is a quartz vein in quartz diorite. Metallic minerals are pyrite and chalcocopyrite.

Development: One short tunnel is reported.

Ref. Hewett, 31:14

#### GOLDEN CHARIOT MINING AND MILLING CO. (Gold)

Sumpter District

Local Name: Golden Chariot.

"Office: Sumpter, Oregon. Chas. Wiedemann, Newport, Ky., Pres.; Oliver E. Conner, Jr., Sumpter, Sec.-Treas. Capital stock \$350,000; par. value \$1;

\$300,000 subscribed, issued and paid up. (1916 report).

"This company took over the old Gold Chariot (Tri-State Mining & Milling Co.) prospect, which is located in sec. 34, T. 9 S., R. 37 E., at an elevation of about 4,500 feet and upon gently rolling foothills about 2 miles east of Sumpter.

"The property is developed by a single compartment shaft and steam power is used with wood for fuel. The country rock is for the most part a hard blue limestone with here and there a small amount of argillite or argillaceous limestone. The ore is not in a vein, but is in a silicified zone which has a general east and west strike. On the surface this zone is said to be narrow, but upon the 210-foot level where the diamond drilling is being done it is about 6 feet wide. This level is developed by a drift a few feet to the east and about 70 feet to the west. A small amount of ore has been stoped from the west and a core drill with chilled steel shot as cutters was in operation during the summer of 1916.

"Manager Conner continued the core drilling of the ore to depths of 500 feet from the 210-foot level until a sufficient number of drill holes had been made to determine the extent of the ore. November reports state that the winze, which is being sunk from the 200 level, is still in free milling ore of good value."

Ref. Parks & Swartley, 16:104 (quoted)

#### LITTLE, HARRIS & WOLFINGER DREDGE

Sumpter District

A dragline dredge has been installed on the L. R. Harris property near Sumpter using a 1½-yard dragline and floating washing plant. Harris has been operating here for some years with shovel and washing plant on skids and has sold a large acreage to this firm. The boat has been operating satisfactorily since October, 1938, and is said to be digging about 2,000 yards per day. Operating in January, 1939.

#### LOY'S MINE (Gold)

Sumpter District

Location: In the extreme northwestern part of Baker county, North Powder district, in sec. 7 (probably), T. 8 S., R. 37 E., and is reached by the way of Sumpter.

History: No production was reported up to 1931.

Geology: The deposit is a quartz vein in quartz diorite. Metallic minerals are pyrite and chalcocopyrite.

Development: There are 4 tunnels, the largest of which is 500 feet.

Ref. Hewett, 31:14.

**MINNIE McDOWELL MINE (Gold, Silver)**  
Sumpter District

The mine is 4 miles northwest from Sumpter. It was located 40 years ago, and consists of a group of 5 unpatented lode claims. It is located in a high mountain area; country rock is granite; vein strata bearing northeast and southwest; width 2 feet, length 1,500 feet. Water is ample; power is available from the Eastern Oregon Light & Power Company, nearby. The mine is idle, but is equipped with a small mill, shop, cars, hand steel, and other tools. Developed with 900 feet of tunnels.

Informant: Prescott, 37

**NUTTING (K. R.) DREDGING CO.**  
Sumpter District

This company from Salinas, California, was test drilling placer ground near Sumpter Valley in July, 1938. Dredge expected to be erected in spring of 1939 on area said to have a life of several years' operation. Dredge operating satisfactorily in May, 1939.

(1-15-39.)

**SILVER KING MINE (Gold)**  
Sumpter District

Owner: W. D. Gordon, Baker, Oregon.

It is 2 miles from Hershall, Oregon. Located in a high mountain area. The country rock is lime and granite, with hanging walls of limestone; granite foot; vein bears northeast and southwest; width 1½ feet. Water is ample; no electric power is available; timber on claim; mine is idle; there is no equipment and only discovery development.

Informant: Prescott, 37.

**SUMPTER VALLEY DREDGING CO.**  
Sumpter District

An Oregon corporation: W. H. Cullers, Pres., Clayton Jones, Vice-pres.; Dr. E. Harris, Treas.; H. F. Dick, Secy. Office 917 Public Service Bldg., Portland, Oregon. O. E. Coombs, Supt., R. O. Shelley, Asst. Supt.

Location about 5 miles below Sumpter in Sumpter valley.

Area: About 1,100 acres.

Began operations June 26, 1935, with probable life of 8 additional years from Jan. 1, 1939. Ground has been entirely drilled with values to 60 feet deep; no deeper drilling done but gravel goes deeper; digging 13 to 16 feet to false clay bedrock; very few boulders, mainly size of football and smaller; gold fineness, 800; average yardage handled for year 1938 was 280,000 cubic yards per month, or about 10 acres.

Equipment: Boat, hull 52 feet by 120 feet by 11 feet; stacker 96 feet with 36-inch belt; bucket line 72, 9-cubic foot buckets dumping 25 per minute; Trommel screen 6 feet by 36 feet; 4,200 square feet of tables with save-all full length of boat; other equipment includes office, sand house, machine shops, two No. 40 diesel tractors and two trucks.

Power: Electric, supplied by 12-mile 23,000 volt line to portable substation, stepped down to 2,300 volts for boat; 710 h. p. connected load with 250 h. p. on digging line; two 10-inch pumps and one 6-inch pump supplying 8,000 gallons per minute.

Refining: Amalgam is retorted and melted at plant and bricks shipped to U. S. Assay office, Seattle, Washington.

General: 23 men employed, annual pay roll \$50,000 to \$60,000.

Power cost: About \$30,000; machine shop and additional supplies, about \$60,000; taxes and other general operating, about \$15,000.

## UPPER BURNT RIVER AREA

### Geography:

The upper Burnt River Area includes the districts formerly called by the various names of Hereford, Bull Run, Unity, and Bridgeport. The area embraces the drainage of Upper Burnt River from the gorge above Durkee where it ties in with the Lower Burnt River area, to a line about half way between Whitney and Unity (China creek) where it connects with the extension of the Green-

horn area. It also includes all of Baker county south and west of Unity.

### Geology:

The eastern part of the area is chiefly argillite with some limestone and old lavas. Most of the western part is covered with recent lavas with frequent "islands" of older rock seen here and there. Burnt river and its various tributaries

have river gravels, sand and clay in them with much gold-bearing gravel. Most of this area has never been geologically mapped and therefore no detailed information is given.

#### BUCKHORN CLAIM (Gold)

Upper Burnt River Area

Owner: Edward Bates, Baker, Oregon.

Location: Is 18 miles south of Baker. Located by Edward Bates about 10 years ago. In high mountain area; country rock is slate and limestone; vein bearing northeast and southwest; width 2 feet. Water is scarce; timber can be obtained nearby.

Informant: Prescott.

#### BULL RUN MINE (Gold, Quartz)

Upper Burnt River Area

Owners: Frank McCulloch, Ed Sullivan, and O. O. Baisley. Baisley's address Unity, Oregon.

61 miles SW. on John Day highway from Baker. Consists of 8 unpatented lode claims. Located in 1910 in high mountains. Country rock, andesite; vein bearing NW. and SE., width 6 feet., property length 6,000 feet. Past production \$10,000. Water from tunnels ample; power generated at the mine by Diesel plant; timber on claims; developed with 1,200 feet of tunnels, three shafts, one 50 feet deep, one 40 feet and one 30 feet. Forester rod mill, flotation, concentrator. Mine is now idle owing to litigation.

Informant: Prescott.

#### BUSTER PLACER (Gold, Asbestos)

Upper Burnt River Area

Owner: Bob Cameron, Baker, Oregon.

On Pine creek 35 miles SW. on John Day highway from shipping point, Baker. Located 2 years ago. There has been no production but there is a good showing of the mineral asbestos. Being further prospected at this time.

Informant: Prescott.

#### BUTTERCUP MINES, INC. (Placer, Quartz,

Asbestos)

Upper Burnt River Area

##### *Placer Claims:*

Operating Company: Buttercup Mines, Inc., address Bridgeport, Oregon. C. F. Glaspell, Pres., N. E. Lewis, Nampa, Idaho, Vice-pres., Gladys L. Glaspell, Sec.-Treas. Incorporated under laws of

Oregon for \$60,000. Stock fully paid, 4 stockholders.

Location: Immediately below old dredge ground in Burnt River canyon in secs. 16 and 17, T. 12 S., R. 41 E. W. M.

Area: Consolidated group of 700 acres, the majority being placer ground including high bars. Placer ground includes area left by previous dredge, which includes small channel and bank bars.

History: No yardage figures available but reported to have produced between \$30,000 and \$60,000 from one or two cuts by intermittent sluicing and dredge cuts.

Equipment:  $\frac{3}{8}$ -yard dragline combination with  $\frac{1}{2}$ -cubic yard bucket. Portable washer on skids with stated capacity of 600 to 750 yards on 2-shift day of 10-hour shift. Complete blacksmith shop and residence.

Geology: Steep canyon topography. Country rock serpentine, limestone and various greenstones of "Burnt River Schist" series. Gravel unusually fine in present pit, but dredge tailings show large amount of medium size boulders and angular slough from steep canyon sides. Gold is typical reconcentration type from ancient high channel bars—rather small with fineness running between 800 and 850. The coarser gold which is sometimes found appears to be of greater average fineness.

Development: Working in Burnt river with portable land washer with "double deck" sluice box. At first used Ainalay bowl which was discarded in favor of sluices. Have 250 feet of pit stripped of 15-foot overburden with 10 to 12 feet of gravel exposed. The overburden has not been tested. Expected to get \$60,000 from 2 parallel cuts although the ground has not been systematically tested. Property lacks sufficient exploration.

##### *Quartz Claims:*

One tunnel at bottom of hill east of houses, extends N. 25 degrees E. for 150 feet (then caved) in dark pencil slate with occasional highly carboniferous layers. The "blow out" on hill above is simply a gossan composed essentially of quartz stringer fragments in a matrix of hematite with minor amounts of limonite and country rock. Several bull quartz veins cut the schists northeasterly from above point. North of the "pit" there are numerous quartz veinlets in the north wall of

the canyon. They vary in width up to 2 feet, but none of them shows any continuity. They are seldom more than 30 or 40 feet long and play out or pinch out into the country rock, which at this locality is limestone. There is no mineralization of the country rock and no sulphides to be seen anywhere.

*Asbestos Claims:*

Location: East half of sec. 17, west half of sec. 16, T. 12 S., R. 41 E. W. M.

→ Area: 7 unpatented claims.

History: Located in July, 1937.

Geology: North shaft 25 feet deep in tuffaceous pencil schists. Pit No. 1 at 40 feet crosscut on top of ridge at elevation 4,050 feet, shows the following section: Footwall of fine grained laminated chlorite schist striking N. 75 degrees E. dipping 35 degrees S. One to 3 feet of tremolite vein consisting of tremolite, asbestos slip fiber up to 6 inches long, 20 per cent. Soapstone massive up to 8 inches thick, 5 per cent. Platy impure brittle tremolite with only small amounts of fiber, 75 per cent. Hanging wall consists of 3 feet of shattered and broken serpentine, chlorite, talc, and tremolite, then 6 feet at least of highly altered greenish rock cut by numerous stringers and veinlets of quartz, calcite, magnesite and cross fiber tremolite not over ½ inch thick. This vein extends for 30 feet in the exposures but depth is unknown. Similar but less extensive "ore" appears in wide veins in cuts for several hundred feet to the south. A cross vein running east and west from pits 3 to 5 also appears.)

Origin: The "greenstone intrusion", as it is called locally, is a dike trending more or less northerly and southerly, across the predominately north 45 degrees E. structures of the slates and schists. The dike is generally dense and massive with individual phenocrysts seldom larger than 2 mm. Gray-green pyroxenes present but not common. Jointing is usually fairly coarse but becomes finer and grades into well defined schistosity to the south where it disappears. The asbestos is very evidently derived from this intrusion. The prospect at a juniper thicket several hundred feet to the southeast of the dike shows faulted and laminated talc-tremolite schists with no fiber.

Informant: A. V. Q. and J. E. A., 37.

**DRY HORSESHOE PLACER**

Upper Burnt River Area

Owner: Jack Conners, 9/16 share, with other small owners. Bridgeport, Oregon.

Location: SE. ¼ sec. 3 and NE. ¼ sec. 10, T. 12 S., R. 41 E. W. M.

Area: 4 claims, 20 acres each.

History: Work started in 1934 with total production about 100 ounces of gold. Old workings were made to some extent many years ago.

Equipment: 1,200 feet of track, 2 mine cars, 2 small gasoline engines, pump, blacksmith equipment, etc.

Development: Main tunnel 1,000 feet, 200 feet of drift. Shaft 125 feet to tunnel level. Total of 300 feet of incline. All of tunnel about 10 to 15 feet above bedrock.

Geology: Slate and limestone bedrock. Boulders up to very large size. Gravel is sub-rounded to sub-angular, often flat. Composed of argillite, limestone, slate, schists, greenstone. Matrix only 15 per cent to 20 per cent of coarse and fine gravel. Gold is coarse with a little fine above, but not above 7 feet from bedrock. 90 per cent is found on bedrock. A few pieces of gold up to \$4 have been found but usually they average from \$.05 to \$.50. The gold is 875 fine. There is no clay. The bedrock is very jagged, rough, and grooved.

Present operation understood to have been abandoned in December, 1938.

Informant: J. E. A., 38.

**ELLIOT & GOLD NUGGETT PLACERS**

Upper Burnt River Area

Owners: L. B. Jackson and W. B. Pattison, Hereford, Oregon.

Location: Mouth of Pine creek above present highway, sec. 26, T. 12 S., R. 39 E.

Area: 300 acres under lease.

History: Gouged and prospected for many years but past machine operations usually failed due to high overhead costs. Humphries Construction Co. (Denver) tested the ground, but available yardage was too small for them to handle so sub-leased the property to the present operators. Sub-lessors began operations in spring of 1937, moving 28,000 yards of gravel and about 14,000 yards of stripping. About \$15,000 in bullion shipped in 1937. Previous production unavailable. Operated April to December.

Equipment: 1 Insley  $\frac{1}{2}$ -yard combination shovel and dragline. Gravel washing plant: Fines to sump; pumped to sluice boxes 50 feet long and 14 inches wide. 25 feet of Hungarian type riffles of  $\frac{3}{16}$  inch by 2 inches angle iron. Water is pumped from Burnt river with 4-inch centrifugal pump throwing 300 to 350 gallons per minute to washing plant.

Geology: Elevation 3,500 feet. Gulch operation mining alluvial fan from Pine creek. Rolling country. False bedrock of sandy clay hardpan, dark colored with "burnt" appearance. True bedrock (probably lava) has never been tested in this locality. Gravel size: 50 per cent 6 inches to 3 feet in diameter. Gold: rather coarse, no nuggets, with fineness of 850. Probable source is reconcentration of higher terrace gravels of Pine creek. Bench gravels above creek near washing plant are being dry-placered by four men who are taking out about \$50 per day with hand-riffle blower.

Development: Humphries Construction Company completely tested pitted entire area, averaging about 50 cents for 280,000 yards of gravel. Present operators sank enough pits to check Humphries' results. Operation recovery bears out accuracy of original sampling.

Approximate costs: 20-25 cents per yard, work in 2 shifts. 500 yards capacity in 24 hours. Plenty of 15 cents to 20 cents ground—too low for present type of operation. Approximately 250,000 yards still to be mined. Probable life is one more season after the present one. Apparently a successful dry land mechanical operation.

Informant: A. V. Q., 38

#### HIGH BAR PLACER

Upper Burnt River Area

Owners: John Wyant, Hereford; W. E. Meeker, Salem; Dr. C. O. Boyer, Portland.

Location: West side of Pine creek, workings at elevation of 4,500 feet; 300 feet above Pine creek, in sec. 15 and the north half of 22, T. 12 S., R. 39 E.

Area: 160 acres owned jointly. 80 acres adjoining to the west owned by John Wyant, Jr.

History: Located in 1916 and 1917. Worked in 1935 by Charles Silbaugh, Pendleton. Gulches from this placer worked in early days.

Equipment: Dragline carried gravel to the edge of the flat where it was shoved by bulldozer through grizzly to bin. Huelsdonk dry concentrator 6 feet wide and 30 feet long run by Mack truck

engine. There were also on the property a small 5 foot testing mechanical blower concentrator, and two 12-foot Stebbins dry concentrators.

Geology: Gold is said to be very fine. The gravel composed of large boulders of lava, quartz and schist with large amounts of flat small pieces often very hard packed and may require blasting. The gravel is at least 10 feet thick, the bottom not seen. It lies on bedrock lavas dipping gently southward. Almost no test pitting has been done.

Informant: Mrs. J. Wyant, via J. E. A.

#### JAMES DRENNEN PLACER (Small Hydraulic)

Upper Burnt River District

Press reports of July, 1938, stated that this placer on Clarks creek near Bridgeport had a good season with ample water for piping, using two reservoirs. Property worked each spring season for several years, during short season.

#### LOG CABIN MINE (Gold, Silver, Nickel)

Upper Burnt River Area

R. J. Cartile located March, 1937, a group of 3 lode claims, in high mountain area; country rock, porphyry, granite, greenstone; vein bearing N. and S.; width 6 feet, length about 400 feet. Water ample from Amelia creek; power from gas engine; timber on claims. Claims are being prospected at present. There are 60 feet of tunnels; one mile from Orion mine and 6 miles from Unity postoffice.

Informant: Prescott.

#### NANCY JOE MINE (Gold)

Upper Burnt River Area

Owners: Mike Hoff and S. B. Larsen, Baker, Oregon. On Cow creek, 36 miles SW. on John Day highway from Baker. Located 23 years ago by Andy Groves and consists of 2 lode claims. High mountain area; country rock serpentine and slate; vein bearing NE. and SW.; width 30 inches. Water is ample; timber on claims; no power. Claim now idle; several hundred feet of tunnels.

Informant: Prescott.

#### NOBODY'S DREAM (Gold)

Upper Burnt River Area

Owners: Mike Hoff and S. B. Larsen, Baker, Oregon, relocated a year ago, as the former owner, Andy Groves, was deceased.

On Cow creek, 36 miles SW. on John Day highway from Baker. Located 25 years ago and consists of 4 claims. In operation at times since located.

Informant: Prescott.



## OREGON MINING COMPANY

## Upper Burnt River Area

Owners: Main office, 1926 Second Ave., Seattle, Washington; J. E. Angle, Pres.; J. R. Angle, Supt.; A. B. Love, Vice-pres.; C. B. Walker, Secy.; incorporated 9/21/37.

Location: Sec. 3 and 9, T. 12 S., R. 41 E.

Area: Bed of Burnt River in the canyon from a point in sec. 3, southwest (upstream) nearly to point where river enters the canyon below Bridgeport. Comprises 12 or 14 placer claims and 80 acres of deeded ground.

History: Property was worked in a small way but never has been dredged before. Dredge started about November 1, 1938.

Equipment: "Universal" gas dragline with 1¼-yard dipper, floating washing plant, Kirk-Hillman airplane placer drill for testing, and caisson shaft sinking outfit, acetylene and electric welding outfits.

Equipment of the Dredge: 70 feet stacker with hand winch, 8 banks on each side of the dredge of 24 inch riffles 20 feet long. Trommel 20 feet long, 5 feet in diameter, one-half inch holes. Waukesha 40 h. p. gasoline engine. Main 8 inch pump run by Buda 60 h. p. gasoline engine. Also, 4 inch pump. The boat is of wood and measures 49 by 28 feet, 3 feet depth.

Geology: Bedrock, mostly schist with a few ribs of limestone crossing the river. It is possible to dig to the bedrock with bucket at all places. River flats are from 200 to 400 feet wide, averaging about 300. The gravel averages 25 feet in depth. Boulders are seldom more than 250 pounds in weight. Gold lies mostly within 5 feet of the bedrock, 50 per cent being upon the bedrock. It is very coarse. The fineness is 850. There is no clay and no false bedrock. The ground was tested by 50 to 60 drill holes and averages 35 cents a yard. Seven test pits were put down with a caisson and checked the drilling.

Informant: J. E. A., 38.

## PURPLE SAGE (Placer)

## Upper Burnt River Area

Owner: Norma Huntington, Hereford, Oregon.

On Pine creek, 35 miles SW. on John Day highway from Baker. Located 14 years ago and has been a moderate producer ever since. Consists of 180 acres placer ground, recorded in Baker county. Ref. Prescott

## RECORD MINE (Gold Quartz)

## Upper Burnt River Area

Old name: Whited Mining Co.

Owner: Whited Brothers.

Present operator: Record Gold Mining Co., Fred N. Nicholson, Pres., Seattle, Wn.; L. T. Kramer, Secy., Enumclaw, Wn.; W. C. Fellows, Mgr., Baker, Oregon. Operated under lease.

Location: 5½ miles SW. of Unity in sec. 11, T. 14 S., R. 46 E.

Area: 15 full-sized unpatented quartz claims and 80 acres deeded.

History: Previous to 1933, 10-stamp mill, water power 4 spring months, operated by Whited Mining Co.

Equipment: Mine—340 cubic foot C. P. Diesel compressor, Leadville 1,500-pound tugger hoist, D-G drills, D-6 sharpener, blacksmith shop, board-in house, bunk house, assay laboratory.

Mill equipment and flow sheet: Four cylinder 240 HP Diesel electric generator 440 volt; ore goes from crude ore bin, 75 ton capacity, to gyratory crusher (20 ton per hour capacity), to Traylor vibrating screen (¾ inch) oversize to Wheeling jaw-crusher, undersize to conveyor to fine-ore bin to 6 feet by 6 feet Traylor ball mill 125 ton capacity. First amalgamation between ball mill and Dorr-24 inch Duplex classifier, second amalgamation overflow from classifier, pulp thence to emulsifier, elevated by Wilfley sand pump to 2-SW Eng. rougher cells, concentrates to cleaner cells, cleaner tails back to circuit at head of classifier and Wilfley table receive splits of tails for recovery test. Final tails pumped up canyon for storage, concentrates to thickener, to Oliver filter, dryer (S. W. Engineering Co.).

Recovery: 94 per cent combined amalgamation and concentration.

Production: Old, \$40,000 in bullion high-grade and concentrates. Since 1933: bullion \$50,000, conc. \$10,000, high grade \$3,000.

Geology: Vein on winding contact of granite and serpentine. Strike N. 45 degrees W. dip vertical, chalcopyrite (small amount) gold 900 fine, balance iron-stained quartz, average width 5 feet, average value \$10. Cross vein 30 feet wide (\$3.00). Mill test \$2.35 recovery, also 10-16-foot parallel vein running \$3.00.

Development: 4 levels all adits, No. 4, 1,400 feet, No. 3, 800 feet, No. 2, 1,000 feet, No. 1, 200 feet.

New winze 120 feet below No. 4 level. Raises connect No. 4 with No. 3 and No. 2, also 500 feet of crosscuts.

Ore Reserves: Most ore extracted above No. 4. Ore in winze 3-5 feet of \$15 average. Deeper development needed to prove ore indicated in winze and exploration on additional levels. Additional pumping and other mine equipment required.

Costs: Reported at \$5.00 per ton mining and milling.

Informant: W. C. Fellows, for assay, values, costs, etc. (A. V. Quine)

Ref. Lorain, 38:41

#### WALL STREET GROUP (Gold)

Upper Burnt River Area

Owner: S. G. Larsen, Baker, Oregon.

On Pine creek 33 miles over John Day highway from Baker. Recently located. High mountains; country rock serpentine and porphyry; vein bearing NE. and SW.; width 7 feet. Water ample, timber on claims; no power. Several hundred feet of tunnels. Claim is idle at present.

Informant: Prescott.

#### JOHN WYANT PLACERS

Upper Burnt River Area

Owner: John Wyant, Hereford, Oregon.

Location: 3½ miles above highway in Pine creek in secs. 10, 3, 2, T. 12 S., R. 39 E., sec 35, T. 11 S.

Area: 12,000 feet along Pine creek.

History: Yardage moved unknown but \$20,000 produced since 1908.

Equipment: No equipment except sluice boxes, small inclined shaft with rails and small pump and windlass. One "splash" dam.

Geology: Elevation at house 4,325 feet. Gulch operation entirely. Bedrock varies from "shaly" basalt to conglomerate and rhyolitic beds. Boulders 10 per cent to 20 per cent, maximum size 2 feet in diameter. 75 per cent of gold in nuggets, fineness 838-846. In a nugget with quartz, the quartz shows a high degree of minute fracturing and shearing, partly iron stained. Argillite belt reported to cut through canyon above, and all gulches reported to head in shale and argillites so that probable source of coarse gold is pocket type with the less coarse gold being washed down from old high channels.

Water: Scarce. Watershed small with little snow storage. Uses rain runoff as it comes. Bedrock drifting in wintertime using bedrock water which flows all year round. "Splash" dam used for ground sluicing in spring which begins about 1st of March and ends July 15th to 30th. Operation handicapped by flat bedrock grade and lack of ample water.

Development: Tested ground gives estimate of 1,000,000 yards averaging \$1 per yard, including overburden. Depth to bedrock average 16½ feet. Pay gravel best in first yard above bedrock. Bedrock yardage \$5 or more per yard.

Informant: A. V. Q.

#### YELLOW MINERALS (Placer)

Upper Burnt River Area

Owner: Ralph Russell, Baker, Oregon.

Placer claim on Pine creek, 33 miles south over John Day highway to shipping point, Baker. Located several years ago and has been a producer almost continuously since. Now being operated. Consists of 2 placer claims.

Informant: Prescott.

### VIRTUE AREA

#### Geography:

The Virtue area embraces the drainage south of the lower Powder River and east of the Baker Valley divide, as far east as Five Mile Creek. The Virtue District proper, one of the oldest in Eastern Oregon, is situated about 7 miles directly east of Baker and is about 12 miles in length from north to south and varies in width from 3 to 6 miles. It occupies the southern part of T. 8 S., practically all of T. 9 S., and the northern part of T. 10 S., all in R. 41 E.

It covers a region of low arid hills rising in the great bend of Powder River. The elevation ranges from 3,400 to 5,000 feet. The hills rise rather

abruptly from Baker valley and, east of the summit, slope gently eastward toward the lower Powder River valley. Most of the drainage is toward the latter. Within these hills is Virtue flat, a sage-covered depression extending 8 miles east and west and 2 miles north and south. The water supply is very scant, the only stream being Ruckle Creek in the extreme eastern part of the district. Good roads from Baker City reach various parts of the district.

#### Geology:

The geology is similar in the main essentials to that of the other mining sections of eastern Ore-

gon (see Gilluly, 37), in that the ore deposits are the result of an intrusion into older flows and sediments. Obscured as it is by the covering of hillside wash, basalt, and lake beds laid down since the time of the intrusion and only partially removed, makes field investigation difficult.

The intrusion exposed over but a limited area in the northern part of the district is a greenish-gray diorite, grading into gabbro. This diorite is probably a local development of a granodiorite intrusion. By this we mean that the intrusion in stopping its way into the older greenstones and argillites has incorporated so much of these older rocks that its acidic nature has been so modified on this upper part as to become sufficiently basic to be called a diorite or gabbro. Erosion has exposed nothing but the diorite, but there are many things which evidence that underneath this modified exterior it will shade into granodiorite at depth.

The argillites and greenstones into which the intrusion came have been much mashed and altered by regional metamorphism, doubtless both before and during the time of the intrusion. Of the older rocks greenstones predominate in the northern part of the district, while argillites are the chief older rocks in the southern part. They doubtless continue underneath their basalt covering many miles to the south and west. Thin basalt flows are found on the tops of the elevations and on much of the hillsides. In Virtue Flat lake bed materials exist to considerable depths.

At different times during the intrusion the diorites were fractured as well as roof of sediments and flows. Into these fractures was injected the dikes which grade from basic to acidic, the latter from granodiorite-porphry to aplite. After the dikes had been formed, later fractures were filled with gold-bearing quartz deposited in them by hot ascending waters coming from the intrusion itself. Since the intrusion apparently is roughly circular, it is to be expected that there would be no parallel vein system. The quartz veins strike in many directions and individual veins are not traceable for long distances. Most of the deposits are normal, simple, quartz veins containing very small amounts of sulphides. The free gold is coarse and contains but little silver. Very rich pockets were frequently found. The total production of the district is about two and one-half millions.

#### BATES (EDWARD) CLAIMS (Gold, Silver)

Virtue District

Owners: Alma Williams, Baker, Oregon.

Two unpatented lode claims,  $9\frac{1}{2}$  miles from Baker were located in 1936. The country rock is greenstone and argillite; vein bears easterly and westerly, width 8 feet. Water, scarce; timber, none. Power from Eastern Oregon Light & Power Co. No mining equipment; there are 400 feet of tunnel and a shaft 45 feet deep.

Informant: Prescott, 37.

#### BENGAL AND PROVIDER CLAIMS (Gold, Tungsten)

Virtue District

Owners: Milo Wuton and Aline Williams, Baker, Oregon.

Located 17 miles from Baker. Consists of 2 lode claims, first located about 30 years ago. In a hilly country; the country rock is porphyry and granite; vein bears north and south, 3 feet wide. Claims are now idle. There are 1,000 feet of tunnels.

Informant: Prescott, 37.

#### BRAZOS MINE (Gold)

Virtue District

"The Brazos mine, in sec. 11, T. 10 S., R. 41 E., was inaccessible in 1930. Considerable work has been done on the property, including the sinking of a 600-foot shaft and driving several drifts, but for many years prior to 1930 the mine had been inactive.

"The mine is developed in black argillite of the Elkhorn Ridge argillite, most of it considerably crushed. The vein, whose outcrops are obscure, strikes northwest and dips southwest at flat angles. The hanging wall is a clay seam; the footwall is also definite. The vein averages from 3 to 4 feet in thickness and is composed of soft black argillite containing little nodules of quartz, which rarely constitute continuous veins. Lindgren believed the discontinuity of the quartz to be due to movements on the vein. All the quartz seams and nodules contain gold, some of it coarse. The pay shoot was said to extend for 400 feet along the vein. The ore was of low grade."

Press reports of August 15, 1938, state that the mine had been leased by Albert Geiser and W. C. Fudge, the owners, to Ray Johnson of Baker, Oregon, and the workings had been unwatered and that sampling was in progress by Nevada interests.

Ref. Lindgren, 01:726

Parks & Swartley, 16:43

Gilluly, Reed, & Park, 33:79

Gilluly, 37:100 (quoted)

**CARROLL B. PROSPECT (Gold)**

Virtue District

"The Carroll B. Prospect consists of 10 claims in SE.  $\frac{1}{4}$  sec. 3, T. 10 S., R. 41 E., which are controlled by S. J. Niblack. The developments consist of a shaft, from which at least one drift, which is partly accessible, has been turned and two adits, each several hundred feet long, on other parts of the property. The predominant country rock is greenstone and cherty argillite of the Elkhorn Ridge argillite, with some gabbro. The quartz vein on which most of the work has been done is 1 to 2 feet thick where exposed in the drift near the shaft. In the other two adits nothing was observed but the greenstone country rock."

Ref. Gilluly, Reed, & Park, 33:78  
Gilluly, 37:100 (quoted)

**CHICAGO-VIRTUE PROSPECT (Gold)**

Virtue District

"The Chicago-Virtue Prospect, locally called the "Barry property", is in sec. 35, T. 9 S., R. 41 E., just south of Virtue Flat. The property was idle in 1930, and apparently little work had been done there for many years.

"The property has been developed by a steeply inclined shaft 86 feet deep, from which a short drift has been run 30 feet below the collar and a crosscut and drift aggregating 250 feet at the bottom of the shaft. No production has been reported.

"The country rock is cherty argillite belonging to the Elkhorn Ridge argillite. The work has been directed to the development of a vein that strikes east and dips 65 degrees S. The vein contains quartz, locally vuggy, elsewhere brecciated, which ranges in thickness from a knife edge to almost a foot. The vein follows a slickensided surface. Nothing is known of the assay value of this quartz."

Ref. Parks & Swartley, 16:53  
Gilluly, Reed, & Park, 33:78  
Gilluly, 37:99 (quoted)

**CLIFF MINE (Gold, Tungsten)**

Virtue District

Owners: Milo and Henry Newton, Baker, Oregon.

Location: 1 mile north of Flagstaff about 5 miles NE. of Baker.

Area: 1 claim.

History: Originally owned by John Bradbury. Developed originally as gold prospect. Tungsten noted in the ore in 1916. Property was leased to F. S. Baillie in 1916 who released the property to

W. E. King who opened and sampled lower workings. Workings are in very poor shape at present and practically inaccessible.

No equipment. Buildings torn down and moved away.

Geology: Country rock is altered diorite capped with Columbia River basalt. Vein where seen on surface consists of brecciated quartz with oxidized vein filling cemented somewhat with calcite. Elevation around 3,600 feet. Accessible all year around. Power within a mile. No timber. Small amount of water to be pumped when mine is in operation.

Development: 225 feet shaft almost vertical; 40-foot level, drift 285 north with 60-foot raise to the surface at 125 feet from shaft. 100-foot level, 140 feet south, with 25-foot up raise; 150-foot level with caved drift south unknown distance. At 200-foot level 25-foot drift north.

Metallurgy: Free milling ore. 135 tons mine run said to have been milled in old Virtue mill. Reported to have netted \$13.55 per ton. Tungsten reported but no definite knowledge obtainable. Vein on surface is 3 feet wide and reported to extend to bottom of shaft.

Informant: A. V. Q.

Ref. Lindgren, 01:725  
Parks & Swartley, 16:56  
Gilluly, Reed, & Park, 33:77  
Gilluly, 37:98

**CYCLONE GROUP (Gold)**

Virtue District

Owner: Molly N. Harpham, Baker, Oregon.

The mine is 7 miles east of Baker. It was located 40 years ago and consists of three unpatented lode claims. The country rock is greenstone; vein bearing northwest and southeast; width 2 feet. Water is scarce; timber not available; power from Eastern Oregon Light & Power Company nearby. The mine is now being operated with a small mill and 5 men.

Informant: Prescott, 37.

**EMMA MINE (Gold)**

Virtue District

Owners: Carl W. Hupke and Walter G. Brown, Baker, Oregon.

The mine is 8 miles of Baker. It was located 40 years ago and consists of a group of 4 unpatented lode claims. The mine is in a hilly area and the country rock is argillite; vein bearing northeast and southwest, width 2 to 5 feet. Mineral is gold.

Water is ample from well; timber can be obtained from mountains 10 miles away; power from Eastern Oregon Light & Power Company nearby. Mine is now idle with no equipment. Developed with 3,000 feet of tunnels, several raises and stopes. Was equipped with a 20-stamp mill in 1905; operated several years; has past production of \$250,000. Closed on account of disagreement in eastern company.

Informant: Prescott.

#### EVENING STAR CLAIMS (Gold)

Virtue District

Owner: E. C. Rea, Baker, Oregon.

The mine is 14 miles east of Baker, Oregon. First located 50 years ago and consists of two unpatented claims. In a hilly area; the country rock is argillite; vein bearing northwest and southeast; width two feet. Mineral is gold. Water is scarce; power can be purchased from Eastern Oregon Light & Power Company close by. Mine is now idle, with no surface equipment. There are 700 feet of tunnels and a 75-foot shaft.

Informant: Prescott, 37.

#### FLAGSTAFF MINE (Gold)

Virtue District

"Location: The Flagstaff mine, owned by J. L. Layden, is in sec. 5, T. 9 S., R. 41 E., on the crest of the divide between Virtue Flat and Baker valley, at an altitude of 3,900 feet. It is less than half a mile from the Baker-Richmond Highway and about 7 miles from Baker.

"Development and production: The mine was actively worked in the years preceding 1898 and has been developed by an inclined shaft 760 feet deep, with levels at 265, 365, and 565 feet. The workings aggregate about 6,000 feet. The only reported production since 1898 was in 1923, when a small output was made incidental to development. The total production of the mine is probably not more than \$100,000.

"Geology: The country rock of the mine consists chiefly of coarse sheared gabbro and quartz-bearing hornblende diorite, both containing much actinolite and some epidote, cut by dikes of biotite-quartz diorite and hornblende-quartz diorite. The two principal rock varieties appear to grade into each other, but in view of their petrographic differences, this is probably due to later metamorphism rather than to an original heterogeneity of a single intrusive mass.

"The biotite-quartz diorite and hornblende-quartz diorite dikes have been recognized only in the mine workings, where exposures are insufficient to demonstrate their attitudes. They are cut by and are clearly older than the mineralized shear zones of the mine.

"The ore deposit consists of several sheared and brecciated zones and veins. They range in strike from N. 45 degrees E. to north and dip steeply, averaging 65 degrees, either east or west.

"The faults and veins are arranged in a frayed pattern. The main vein, in whose footwall the incline is sunk, flattens from a dip of about 75 degrees in the upper workings to about 55 degrees on the 565-foot level. The drifts on the three levels, from this shaft trend successively more northward on the lower levels, although they start on what is almost certainly the same vein at the shaft. Inasmuch as the dips of these principal veins are all southeastward, the necessary conclusion from this arrangement is that a number of branch veins must joint the main vein \* \* \*. The raises and manways of the mine were all inaccessible, owing to defective timbers, so that it was impossible to pass from one level to another except at the main shaft. The "horsetail" arrangement of the veins suggests torsion about a steeply inclined axis.

"The faults through the gabbro and diorite are all accompanied by great masses of clay gouge. Some of this gouge is probably due to comminution of the country rock by friction, but much of it is hydrothermal rather than mechanical in origin, as is shown by the association of zeolites with the clays.

"Within these masses of gouge are extremely irregular brecciated lenses of quartz. These masses locally range from a knife edge to more than a foot in thickness in a few feet of strike length. The maximum thickness of quartz observed in any one stringer was 1½ feet, although in one place, where the shear zone is over 20 feet wide, several lenses whose aggregate thickness is about 4 feet are present. The shear zones themselves are irregular; they probably average about 3 feet in thickness.

"In some places the quartz is massive and coarse crystalline, in others vuggy, and in still others sheeted and brecciated. Gold is present in the quartz but according to Mr. Layden occurs also in the gouge, though in less amount. No sulphides were observed during this survey, but tetrahedrite,

stignite, and scheelite have been recorded from the mine by Lindgren.

"The principal minerals of the altered rock are a clay mineral, sericite, calcite, serpentine, and a zeolite related to chabazite. Locally the wall rock is silicified, but more commonly it is altered to clay.

"No assay samples were collected, but Lindgren reports average values of \$16 to the ton in the quartz. According to Mr. Layden, large quantities of the gouge-like material will assay \$5 to the ton, on the basis of gold at \$20.67 an ounce. The largest stopes in the mine occur at the junctions of fissures. Here the shear zones are wider and commonly have more quartz, with higher gold assays.

"The lowest accessible level, the 560-foot, is seemingly less well mineralized than the higher levels. The exposed shear zones are narrower and carry less quartz. Mr. Layden believes that the future of the property is dependent on large-scale mining of the gouge-like material with its relatively low gold tenor of \$5 to the ton \* \* \*.

"The water level in the mine is just below the 560-foot level, about 420 feet vertically below the outcrop and not far above the level of Baker valley."

Ref. Lindgren, 01:724  
Swartley, 14:130  
Parks & Swartley, 16:93  
Grant & Cady, 14:152  
Gilluly, Reed, & Park, 33:74 (quoted)  
Gilluly, 37:96

#### FOSTER (R. S.) CLAIMS Black Bird Claim (Diatomite)

Virtue District

Owner: R. S. Foster, Baker, Oregon.

Location: ¼ mile SW. of Virtue Road in sec. 33, T. 9 S., R. 41 E., 1 mile W. of Black Lode Claim.

Consists of 1 unpatented placer claim of 20 acres. Some development work on this diatomite was done 25 years ago by Sylvester and Potts. The diatomite shows a thickness of at least 7 feet which is probably much more as it is visible up and down the hillside for at least 25 feet. It is both pure light gray and less pure yellow tinged. Its lateral extent has not been demonstrated.

The property is located 3½ miles from the railroad siding. There is no timber on the property and little or no water.

Informant: J. E. A., 38.

#### FOSTER, (R. S.) CLAIM

Black Lode Claim (Gold)

Virtue District

Owner: R. S. Foster, Baker, Oregon.

Location: ¼ mile due south of Last Chance Claim, sec. 3, T. 10 S., R. 41 E.

Area: 1 claim running north 60 degrees W.

Geology: Country rock composed of banded lenticular cherts, interbedded with shale, more or less replaced and impregnated with manganite and other manganese oxides. Considerable clay-like and soap stone-like material as well as light yellow limonite stains, accompanies the ore. Ore can be sorted 30 to 45 per cent MnO<sub>2</sub>. Mill run would be very low.

Chert strikes N. 60 degrees W., dips 60 degrees S. Ore apparently has similar attitude and is at least 4 feet wide being exposed for 20 feet with a depth of at least 5 feet. Some of the shale interbeds partially replaced to give a black manganese shale. The ore is somewhat faulted and displaced.

Development: Several small open cuts and one cut about 20 feet long have been made but with the one exception nothing but float is exposed in any of these cuts.

At a point 100 feet north of the SW. corner post near the bottom of the gulch an inclined tunnel trending southwest and sloping 35 degrees has been driven on a quartz vein 1 to 2½ feet wide for a distance of 200 feet. This persistent vein was sampled but showed no values of importance.

There is no timber on the property and little or no water. The railroad is 3 miles distant by dirt road.

Informant: J. E. A., 38.

#### FRIDAY MINE INC. (Gold)

Virtue District

(East portion of Columbia-Friday ground)

Walter Fellows, Sam Anderson, and Kenneth E. Grabner of Baker, incorporators. Capitalization, \$25,000. Consists of one patented mine claim located 10 miles east of Baker just east of Hidden Treasure near the Baker-Cornucopia Highway. The property was explored to 200 feet depth 30 years ago but has been idle since until recently opened by the corporation. One 50-ton car of ore was shipped to the smelter. Closed Sept., 1938.

Informant: Press report, Aug.-Sept., 1938.

Ref. Lindgren, 01:725  
Gilluly, 37:100

**HIDDEN TREASURE MINE (Gold)**

Virtue District

Owners: Mike Hoff and Miles Rombough, Baker, Oregon.

Location: 10 miles east of Baker, ¼ mile north of highway.

Area: 4 claims and 1 millsite.

Production since 1933: \$24,000. No past history.

Equipment: 3 jackhammers, hoist, compressor, blower, generator, and assay office.

Geology: Rolling topography. Country rock is altered and highly-sheared greenstone, overlain by faulted lake beds. Elevation 3,500 feet. No timber; no water. Little snowfall. Vein is in highly-altered greenstones, dipping at about 60 degrees. Vein minerals: gold, silver, stibnite, and pyrites (small amount). Stains of manganese apparently indicate presence of high-grade ore, as does also the presence of stibnite. Mineralization spotty with no definite series known to operators.

Development: Shaft: 138 feet at 60-degree angle. No. 1 level at 55 feet with drift SE. 170 feet with winze down 30 feet; drift NW. 35 feet. No. 2 level: at 80 feet NW. drift 100 feet, winze at 38 feet. No. 3 level at 138 feet, SE. drift 100 feet to connect with No. 1 winze, NW. dip 48 feet.

Metallurgy: The ore is relatively soft and broken occurring sometimes as brecciated masses and sometimes as elongated kidneys. No mill on the property as the ore mined is still of the shipping grade only. Average value of shipping grade is about \$65.

Fire caused a loss of \$12,000 at the Hidden Treasure mine in the Virtue District near Baker, Oregon, on July 21, 1938. A cyanide pilot plant was just ready to be put into operation when the fire occurred, started when gasoline was spilled and ignited by a miner's lamp, which in turn caused two boxes of dynamite to explode. Surface buildings and equipment reported to be a total loss. Reconstruction work started immediately. First shipment from the rehabilitated mine was made early in September.

Informant: A. V. Q., 38.

Ref. Gilluly, 37:100

**INDEPENDENT No. 1 (Gold)**

Virtue District

Owner: Mabel A. Griffith, Baker, Oregon.

Property is 12 miles east of Baker and consists of 6 unpatented lode claims. Located 25 years ago by George Cullen. In a hilly area; the country rock

is greenstone; vein bearing northwest and southeast; width 3 feet. Mineral is gold. Water is scarce; power from Eastern Oregon Light & Power Company nearby; timber not available; no tools or equipment.

Informant: Prescott, 37.

**INDEPENDENT NUMBER 2 (Gold)**

Virtue District

Owner: Mrs. Sadie Cullen, Baker, Oregon.

Property is 12 miles east of Baker. Consists of two unpatented claims located 25 years ago by George Cullen. In a hilly area; the country rock is greenstone; vein bearing northwest and southeast, width 5 feet. Mineral is gold. Water is scarce; power from the Eastern Oregon Light & Power Company nearby; no timber; assessment work is kept up.

Informant: Prescott, 37.

**KOEHLER MINE (Antimony)**

Virtue District

Owner: Dr. A. Koehler, Baker, Oregon.

According to Prescott, consists of 6 claims including the Dandy Jim group of two claims.

"The Koehler mine is on the west slope of the range of hills lying south of the Flagstaff mine. The workings were inaccessible at the time of this survey. According to Parks and Swartley (16:137) the mine yielded antimony and gold beginning late in 1915. The vein is reported to be well defined, with a maximum width of about 10 feet. Stibnite is distributed through the whole width of the vein, but massive stibnite occurred near the hanging wall in lenses that were 2 feet thick. Some of these lenses yielded ore that was shipped direct; other ore was brought up to grade by sorting. Several carloads carrying over 50 per cent of antimony were shipped in 1915, and the receipts from these sales are reported to have been about \$15,000."

Ref. Gilluly, Reed, & Parks, 33:76  
Gilluly, 37:97 (quoted)

**LAST CHANCE CLAIM (Gold)**

Virtue District

Owners: Robert Palmer and Hugh Denham, Baker, Oregon.

Operator: Leased to W. M. Payton, Box 186, Route 2, Baker.

Location: In sec. 2, T. 10 S., R. 41 E., W. M. About 3½ miles northeast of the station of Encina on the railroad and highway No. 30, at a point 7 miles southeast of Baker.

History: No previous production, although considerable prospecting work has been done in former years.

Equipment: One small cabin and hand winch.

Geology: The property lies on a rolling upland which is covered with water-worn boulders from lake beds. At the mine the bedrock is a silicified and oxidized and almost unrecognizable argillite. It is highly crushed and faulted. The vein consists of about 6 to 10 inches of white quartz partly in place and partly scattered through a 4-foot zone of limonitic clay and gouge. Both footwall and hanging wall are distinct and clean, the former striking N. 80 degrees E. dipping 60 degrees S., and the latter striking east and dipping 85 degrees to the S. The quartz is nearest the hanging wall where the highest values are also said to lie. The ore is free milling and at the surface is said to have run 60 cents, rising until at the present depth of 40 feet the last assay gave \$5.60. The ore shoot, however, seems to be rather narrow, as values disappear in either direction along the vein when tested by short lateral drifts.

Development: Located on the vein are two shafts about 40 feet deep and 30 feet apart with short drifts from them at various levels. An old tunnel was dug from a point about 200 feet to the east (downhill) but never reached the shoot.

Informant: Mrs. W. M. Payton, via J. E. A., 38.

**NITZLANDER RANCH (Gold, Manganese,  
Copper)**

Virtue District

Owner: Randolph Nitzlander, Pleasant Valley, Oregon.

The property is one mile from Pleasant Valley. The Ranch (960 acres) and one lode claim of 20 acres were deeded to Nitzlander 30 years ago. Located in hilly area. The country rock is greenstone and lime; vein bearing northeast and southwest, width 5 feet, length unknown. Vein is quartz. There has been no development done.

Informant: Prescott, 37.

**NORWOOD MINE (Gold)**

Virtue District

"The Norwood mine, in sec. 8, T. 9 S., R. 41 E., about 2 miles north of the Virtue, was caved and inaccessible in 1930. The property has been described as embracing two lode claims. The country rock is greenstone cut by several quartz and calcite veins, mostly rather small, and shows considerable post-mineral brecciation. The largest vein dips

steeply, strikes west, and averages about 2 feet in width. A small mill was installed in 1913, but no production has been reported. Little or no work has been done for many years at this property."

Ref. Swartley, 14:131

Grant & Cady, 14:152

Parks & Swartley, 16:174

Gilluly, Reed, & Park, 33:76

Gilluly, 37:98 (quoted)

**OREGON TRAIL MINE (Gold)**

Virtue District

Owner: J. E. Caldwell, Baker, Oregon.

Property is 7 miles east of Baker. It was located 4 years ago and consists of 6 unpatented claims. Lies in a hilly area; the country rock is granite, footwall is lime; vein bearing northwest and southeast, width is 2 feet. Mineral is gold. Water is scarce; power can be purchased from Eastern Oregon Light & Power Company nearby. Further prospecting is being carried on. The vein is persistent and good values are found.

Informant: Prescott, 37.

**PAT MINE (Gold)**

Virtue District

Owner: J. E. Caldwell, Baker, Oregon.

Lessor: E. H. Hanson, Spokane, Washington.

Early 1938 press reports state that this group of seven unpatented claims adjoining the Virtue Mine was being sampled and equipment was being assembled. Vein strikes NW.-SE., width 3 feet, greenstone walls.

**RACHEL CONSOLIDATED QUARTZ CLAIMS  
(Gold)**

Virtue District

Owner: Harry H. Waggoner, Baker, Oregon.

Located in secs. 7 and 8, T. 9 S., R. 41 E., 93 acres patented lands. Width of vein 1 to 3 feet. Production claimed \$150,000. Developed 800 feet on incline at 200-foot intervals with 3,000 feet of development. All building and equipment gone. Geology similar to other properties in the district.

**VIRTUE MINE (Gold)**

Virtue District

Owner: Virtue Mines Development Co. Oregon corporation; Wm. Wendt, Pres., M. Beswell, Secy., Baker, Oregon; capitalization, \$1,250,000 common, \$250,000 preferred.

In 1938 a corporate group secured the property under terms and made plans for the development and operation of the property but the present status of this arrangement are not known. There has



been no important change in the conditions since the following report was written in 1930.

"Location: The Virtue mine, which has given its name to the district and has hitherto been the greatest producer in it, is situated in sec. 21, T. 9 S., R. 41 E., at the foot of the hills bounding Virtue Flat on the south. It is about 3 miles south of the Baker-Richland highway and about 12 miles by road from Baker.

"History and production: The veins worked in the Virtue mine, according to Lindgren, were discovered in 1862 by tracing up the rich placers in the gulch below. For the next 10 years the mine was known as the Rucker or Union Mine and was very actively worked. Between 1871 and 1878 it was worked almost continuously, largely by Brown & Virtue. In 1878 it was sold to Grayson & Co., of San Francisco, who worked it in a more or less satisfactory way until 1884. It was then idle until 1893, when work was resumed and continued until 1898 with excellent results. After a short period of idleness the mine was sold to the Consolidated Virtue Mine Co., of Montreal, Canada, which also owned the adjoining Collateral mine. The upper parts of the mine were worked for a short time, and the mine was again closed August 1, 1899. The property has not since been worked except for a brief interval in 1906-7, when a little ore was extracted above the drainage level and about \$1,500 was obtained from ore on the dump. The total production has been about \$2,200,000.

"At the time of this survey the mine was almost entirely inaccessible except for a mill-tunnel level and a few stopes above it, so that little can be added to the description of Lindgren.

"Development: The mine is developed by three tunnels, the lowest, or mill level, about 300 feet below the outcrop. From the lowest tunnel a vertical shaft was sunk 800 feet and crosscuts were made to the vein every 100 feet. The levels extend 200 to 400 feet north of the shaft and 800 to 900 feet south of it. Development work aggregates not less than 10,000 feet.

"Geology: The country rock is strongly sheared greenstone, highly chloritic and somewhat serpentinous. It was regarded by Lindgren as an altered volcanic tuff or breccia, and some of it may be of this origin, but most of it is believed to be a strongly sheared gabbro. Specimens collected in the crosscut on the mill level show all gradations between a chloritic schist whose origin it would

be impossible to determine from the specimen itself and a brecciated and chloritized rock that is clearly derived from the brecciation of a gabbro. Accordingly it is considered likely that other rocks in the mine whose mottled schistose character at first suggests their origin as tuffs are also sheared gabbro. It is clear that sheared gabbro forms most of the rounded hill south of the mine.

"Eight veins, of which the Virtue, Collateral, and Chicago have been the most productive, have been cut in the mine workings. The Chicago and Collateral were formerly the basis for independent mines, but all are now owned by one company. They are subparallel and strike N. 20 degrees to 45 degrees W. They dip northeast above the mill level but steepen downward and dip southwest in the lower workings of the mine.

"The veins range in thickness from 6 inches to 12 feet and average about 14 inches. They are filled with white coarsely crystalline quartz and subordinate calcite. Vugs are common. Free gold, coarse and partly crystalline, with the unusual fineness of 0.940, is reported by Lindgren. The only sulphides observed were pyrite and chalcopryrite, both of which are sparingly present. The veins are locally brecciated and banded parallel to the walls, and these places are reported to have been richest. Veinlets of calcite, quartz, and pyrite occur in the country rock bordering the veins. Lindgren reports that the richest ore occurred near the surface. Average returns of \$20 to the ton were obtained in 1870, of \$40 in 1873, of \$24 in 1875, and from \$15 to \$16 between 1893 and 1898.

"The pay shoot is said to have been cut off between the seventh and eighth levels at a brecciated zone below which the vein was of very low grade. Warm water was encountered in the lower levels and stands in the shaft to a point a short distance below the mill level, considerably above the valley. This was interpreted by Lindgren, doubtless correctly, as an ascending column of underground circulation. A fault separates the Tertiary beds of Virtue Flat from the pre-Tertiary rocks to the southwest, and it seems that this fault may well have afforded a channel for the warm water from the deeper levels. Gouge, sealing the fault above, may account for the height of the water level in the mine."

Ref. Lindgren, 01:722  
Swartley, 14:130  
Grant & Cady, 14:150  
Parks & Swartley, 16:229  
Gilluly, Reed, & Park, 33:72  
Gilluly, 37:94 (quoted)

### WHITE SWAN MINE (Gold)

Virtue District

"The White Swan mine is situated at the foot of the hills south of Virtue Flat, in sec. 25, T. 9 S., R. 41 E. It is about 5 miles from the Baker-Richland highway and about 14 miles from Baker by road.

"According to Lindgren (01:725) the White Swan deposit was discovered in the early days by following up the rich placers of the gulch below. The mine was vigorously operated about 1890 but was closed in 1897. It was reopened about 1900 and operated by Letson Balliet until 1903, when it was again closed. Lindgren estimated the total production at not less than \$200,000, on the basis of Mint reports of output in 1891 as \$72,000 and in 1892 as \$72,642.

"In 1930 the mine was being reopened by a Washington syndicate, with E. McNaughton as manager, but at the time of visit very little of the old workings were accessible.

"The mine was developed by a nearly vertical shaft 300 feet deep, from which four levels were turned. About 2,000 feet of development work has been done.

"The country rock is argillite, consisting of dark carbonaceous argillite with interbedded layers of

chert and greenstone. The greenstone represents altered volcanic sediments. Intrusive into this argillite formation are several narrow dikes of diorite porphyry. The general strike of the formation is westward.

"Several narrow veins are exposed in the vicinity of the mine. All trend generally west, but there is no consistent parallelism observable, although most dip steeply south. The exposed veins reach thicknesses of 1 to 1½ feet, but more common widths are a few inches. No information is available regarding the thickness of the White Swan vein in the old workings.

"The only minerals observed in the veins were quartz, sericite, and calcite, with a little limonite to attest the former presence of sulphides, which, however, must have been sparse."

In September, 1935, White Swan Gold, Inc., had spent \$175,000 in development, rehabilitation, in mine and mill equipment and in operation with a production of \$30,000. The mine was shut down in September, 1937.

Ref. Lindgren, 01:725  
Swartley, 14:131  
Gilluly, Reed, & Park, 33:77  
Gilluly, 37:98 (quoted)  
Lorain, 38:26

## UNION COUNTY

(Camp Carson, Medical Springs and Upper Eagle Creek)

Broadly speaking, the main geographical feature of the country is the Grande Ronde valley which lies between the Blue Mountains on the west and the Wallawas on the east. Most of the area is in this large basin, with drainage of the Grande Ronde River north and east to the Snake. U. S. Highway 30, the route of the Old Oregon Trail, crosses the country northeast and southwest, as does the main line of the Union Pacific Railroad. The attractive city of La Grande, with a population of over 8,000, is the county seat and center of trade.

Mining districts are in the southern part close to Baker and Wallowa Counties, and the economic geology is the same as that described under those counties. Much of northern Union county is covered by Columbia River basalts.

The properties listed are in three districts, namely, Camp Carson, Medical Springs, and the upper part of Eagle Creek. Many more mining properties than those mentioned are known, but no Department investigation of them could be

made. The only information available is that given by Lindgren in 1900. A list of properties is given at the end of this chapter.

The Camp Carson District near the headwaters of the Grande Ronde River is about 20 miles in an air line north of Sumpter, but is usually reached either from La Grande or North Powder. It is in the northwestern extension of the Elkhorn range in a timbered region and is a part of Lindgren's Bald Mountain batholith.

Placer deposits have been and are being worked below Camp Carson, although the cemented nature of some of the gravels has caused difficulties. In addition quartz veins containing sulphides have been prospected.

The Medical Springs District is about 18 miles northeast of Baker over a good road. This is an old district which has been prospected from time to time since early days. Country rock is a siliceous greenstone of probable Permian age, exposed by erosion of overlying Columbia River basalts.

Two molybdenite deposits are listed in the upper Eagle Creek District, although no Department reconnaissance has been made. The occurrences are probably in tactite zones similar to those described in other Wallowa Mountain deposits under Wallowa county.

Recorded production of Union county has been small.

#### ADIAHA PLACER MINE

Camp Carson District

Owner: Harold Parker, North Powder, Oregon.

Near Camp Carson and 15 miles west from North Powder, Oregon. Located by Harold Parker, recorded in La Grande, Union county, Oregon. Consists of 160 acres and a group of 8 placer claims. Mineral is gold, and the pay is found to be from 10 feet to 12 feet in depth.

Informant: Prescott, 37.

#### CARSON HILL PLACERS

(Camp Carson Placers—Carson Channel

Gold Syndicate)

Camp Carson District

Owner: Anne Oliver, La Grande, Oregon. Harry T. Howell, Lessee, Baker, Oregon.

Location: On the upper Grande Ronde River in sec. 28, T. 6 S., R. 36 E., in the extreme southern part of Union county. It is reached by the way of the road south from La Grande in the Grande Ronde valley.

Geology: "Old placers have been worked in the Grande Ronde below Camp Carson, and also on Limber Jim Creek, 6 miles northward. Camp Carson itself is located at the head of Tanner's gulch, 1,200 feet above Grande Ronde River. These high placers contain a large body of well-washed, cemented, coarse gravels, presenting a bank 2,500 feet long and generally 15 to 20 feet high. This body of gravels is not exactly situated on the divide, as there are granite hills rising behind them; but it is apparent that they must have been deposited by a river system at a very different level from that of today, and it is probable that they should be placed in the same category as those of the Griffith claims below Bald Mountain.

"While the gravels contain gold, their cemented nature interferes with the normal hydraulic process."

It has been reported in current news items that this operation is in the old Blue Channel of ce-

mented gravels, and that about 3,000 yards of material are being washed daily by a 4-inch hydraulic giant. The gravel handled is said to run about 20 cents a yard. It is also reported that gravel on Little Clear Creek is included in the lease and will be worked with a dragline. Present water supply allows a five-month season; by constructing reservoirs it is planned to increase this to a seven-month season.

Ref. Lindgren, 01:676 (quoted)

#### DODSON (JIM) GROUP (Molybdenite)

Upper Eagle Creek District

Location: Close to the line between Union and Baker counties, near the head and to the east of Copper Creek, a branch of Eagle Creek, in the SE.  $\frac{1}{4}$  of T. 5 S., R. 43 E.

Geology: It is reported that there is a zone 20 to 40 feet wide which shows disseminated molybdenite. In this zone is a smaller zone, a few feet wide, containing bunches of magnetite impregnated with molybdenite.

Informant: R. S. Veatch, via Swartley.

#### GRANDE RONDE MINES (Gold)

Camp Carson District

(Including Aurelia and Standard Properties)

Owner: Grande Ronde Mines, Inc., C. H. D. Douglas, Pres., Yakima, Washington.

Location: Sec. 26, T. 6 S., R. 36 E., in the southern part of Union county. The property is reached by the way of the Anthony Lakes road which leaves U. S. Highway 30 at North Powder.

Geology: No definite information is available. It is reported that a crosscut tunnel has been driven to the Standard vein which is 22 feet wide on the surface and can be traced for about 2,000 feet by means of surface cuts. It is said that there has been considerable development work done in the past from which some high-grade ore was produced.

Informant: Current news items.

#### GRULL MINE (Gold)

Medical Springs District

Owner: Andy Grull, Medical Springs, Oregon.

Location: In the extreme southern part of the county about 2 miles northeast of Medical Springs in sec. 20, T. 6 S., R. 42 E. The property is in the gulch southeast of the Twin Baby Mine. Medical

Springs is about 18 miles by road northeast of Baker.

Area: 9 patented claims.

Geology: A crosscut tunnel exposes Tertiary sediments associated with an andesite flow for about 200 feet and then continues in a hard, siliceous greenstone. The greenstone contains veins of chalcopyrite and pyrrhotite. Oxidation minerals include hematite, nontronite, gypsum, and limonite. The tunnel was intended to cut a quartz vein that outcrops on the hill north of the gulch, and which is reported to pan well in gold.

Development: It is reported that development consists of 1,000 feet of tunneling. There is a 5-ton mill, together with small tools.

Ref. Gilluly, Reed & Parks, 33:70

#### RAINBOW MINE (Placer) Camp Carson District

Owners: H. A. Mosier, Portland, Oregon; C. C. Clement, and W. A. McCall, Route 2, La Grande, Oregon.

Location: The property lies in secs. 1 and 2, T. 6 S., R. 36 E., and sec. 6, T. 6 S., R. 37 E., southeast of La Grande, and is described as sloping from north to south off Rainbow Mountain into the west fork of the Grande Ronde River.

Area: Total 740 acres of which 300 acres are considered workable.

Geology: The deposit is described as glacial and old channel, with the western portion mainly blue quartz river bedrock, the central in porphyry, while the eastern portion is nearly all quartzite. The principal western setup contains some 400,000 yards of gravel considered favorable for operating. The central porphyry ground is said to have 250,000 yards of favorably placed gravel. Most of the work has been done in this pit, and it is stated that a minimum of 50 cents per yard can be produced here. The eastern portion is larger than either of the others and will run about the same as the central part.

Equipment: Water rights are reported to be secure. There are 4 miles of ditch with a capacity of 4 second feet, together with 500 feet of pipe, a cabin and tent house. Trails and roads have been built, and a telephone with connections installed. It is stated that the completed water system would supply four 2-inch pressure streams day and night for 60 days, reduced to day runs for an additional

40 days, and one 2-inch for the rest of the season on the high lines.

Informant: C. C. Clement, owner, 37.

#### VINDICATOR GOLD MINES, INC. (Twin Baby Mine) Medical Springs District

Owner: Vindicator Mines, Inc., W. M. Mayers, Secy., 2404 SE. Ladd Ave., Portland, Oregon.

Location: The property is 2½ miles northeast of Medical Springs on the divide between two tributaries of Big Creek in sec. 20, T. 6 S., R. 42 E. It is reached by road, 3½ miles long, from Medical Springs.

Area: 9 claims of 20 acres each.

History: Placering in the early days led to the discovery of quartz veins in the district. Exact production figures are not known. Some mining from shallow depths was done prior to 1900. The district has been relatively inactive until recently. In 1936 an underground crew of 4 men was producing 12 tons of ore per day, working one shift.

Geology: The country rock is greenstone. Surface prospecting is hindered by a heavy mantle of soil. A quartz vein with a maximum width of 2 feet trends N. 5 degrees W. and dips 80 degrees E. Vein filling is brecciated quartz stained with iron oxide, jarosite, and malachite and contains some pyrite and chalcopyrite. Two ore shoots, each about 70 feet long, have been developed. A vertical working shaft has been sunk 335 feet on the vein, and work prosecuted on two levels, the 235 and 335. Most of the production is from the 235-foot level, which has been driven a total of 600 feet on the vein north and south of the shaft. A seam of gouge usually accompanies the vein. The vein fissure appears strong and persistent; and, although the shoots are relatively short, values are uniform. The average value of the ore is not known. In 1936 the mine was reported making 12 gallons of water per minute.

Equipment: Plant consists of 620 cubic foot air compressor, a 40-ton amalgamation flotation mill, with shops, cook house, and cabins.

Remarks: Operating conditions are reported as favorable for small-scale operations. Profitable operation depends upon the cost of dead work necessary in developing ore.

Ref. Lorain, 38:31  
Gilluly, Reed & Parks, 33:70

**VEATCH CLAIM (Molybdenite)**

Upper Eagle Creek District

Owner: R. S. Veatch, Portland, Oregon.

Location: Close to the line between Baker and Union counties, on the west side of Copper Creek, a tributary of Eagle Creek, in the SE.  $\frac{1}{4}$  of T. 5 S., R. 43 E. The claim is west of the Dodson group.

Area: 1 claim.

Geology: Two veins are reported; No. 1 is 1 to 10 feet wide with an average of 3 feet of good grade molybdenite; No. 2 is from 2 to 6 feet wide of about the same grade as No. 1. The veins are parallel and about 200 feet apart.

Informant: R. S. Veatch, Portland, Oregon.

**PROPERTIES IN ADDITION TO THOSE DESCRIBED***Camp Carson District:*

Blue Channel  
Camp Carson Mining and Power Co.  
Muir  
Pay Boy  
Royal  
Indiana

*Medical Springs District:*

Puzzle  
Ref. Lindgren, 01:676, 677

**WALLOWA COUNTY**

(Imnaha, Wallowa Range, and Snake River Districts)

This area occupies the extreme northeastern part of the state and is noted for its mountain scenery and recreational areas. Much of the region is relatively inaccessible, and that, together with a rigorous winter climate, makes prospecting and development of mineral deposits difficult. Broadly speaking, the three main geographic as well as physiographic features of the country are the Wallowa Mountains, the dissected plateau region to the north, and the Snake River Canyon. Of these, the Wallowa Mountain region contains the majority of known mineral deposits listed in this report.

The Wallowa valley is served by the La Grande-Joseph branch of the Union Pacific R. R., and by hard-surfaced State Highway 82. Several mountain roads lead north and east from Enterprise, the county seat, while access south into the Wallowas is over a Forest Service road which extends 18 miles up the Lostine River valley. Trails follow the east and west forks of the Lostine River to the Lakes Basin and the summit of the range. Hurricane Creek is reached from either Enterprise or Joseph. An excellent trail follows the creek to its headwaters of the Imnaha River, and the trail up the east fork passes Aneroid Lake and continues south across the Imnaha River to the Cornucopia Mine. The southern part of the range is reached by means of market and forest road through Keating and up main Eagle Creek. Trails along main streams lead to the high country.

The average relief of the Wallowas is about 3,000 feet, with elevations ranging from 4,500 to

10,000 feet. Hillside slopes of 30 degrees are common; north-south trending ridges are fairly continuous.

In order of age, beginning with the oldest, the rock types of the range are greenstones, metamorphosed sediments, marbles and limestones, basalts, alluvial and glacial.

The greenstones are generally hard, dense, dark green rocks, considered to be Triassic or older.

The metamorphosed sediments overlie the greenstones and are interbedded with several horizons of crystalline limestone or marble. These sediments may be highly calcareous near marble contacts or highly siliceous types where intruded by granitoid rocks. Argillitic portions of the group range from dark fossiliferous shales to dense, hard argillites or hornfels that are almost basaltic in appearance. Banding is apparent even in the more altered types, but slaty cleavage is seldom developed. Finely divided disseminated pyrite is common. Fossils indicate Triassic age.

Limestones have all been metamorphosed and are properly classed as marbles. Color varieties are white, black, pink, and yellow; contortions in the banding often indicate flowage around inclusions. Age is probably Triassic.

Granitoid rocks are predominant in the central portion of the Wallowa Range. They are variously named granodiorite, quartz diorite, diorite, biotite-quartz-diorite, tonalite, "stock" rock, etc. Aplite and pegmatite dikes occur in several localities. Contacts of these granitoids with argillite and greenstone are usually without contact meta-

morphic minerals, but considerable silification frequently occurs. These rocks are considered to be of upper Jurassic or lower Cretaceous age.

The basalts are usually dense, dark gray to black aphanitic lavas. Flows cap the ridges along the northern edge of the range. They are assumed to correlate with Columbia River basalt and are therefore of middle Miocene age.

Alluvial or unconsolidated deposits within the central Wallowa Mountains are glacial or derived directly from glacial deposits, and are of Pleistocene age.

Dark colored dikes, so-called "iron dikes", cut all types of rocks. They appear to be predominantly basaltic. Many dikes, however, which appear to be basaltic are more properly classed as lamprophyric phases of the granitoid intrusions.

The most favorable development of economic metallic minerals in the Wallowas occurs at or near granodiorite-limestone contacts in a tactite zone. Mineralization is also associated with some of the lamprophyric dikes. These contact zones may contain molybdenite, scheelite, copper minerals, gold and silver.

Many of the limestones of the district are pure and would burn to a high-calcium lime. Large areas are suitable for cement rock. Marbles of the various colors are available and could be processed to make superior stones for the various architectural uses. All such deposits are seriously handicapped, however, by lack of transportation facilities. The black marble quarry of the Northwest Lime Co. at Enterprise is the most favorably situated.

Gold placer deposits on the Imnaha River are unproved but appear to have the values localized. Bedrock values have not been determined.

Copper deposits in the greenstones along the Snake River may have future importance. Gold and silver properties in the canyon area are known and may warrant development when transportation handicaps are overcome. Extensive limestone occurrences are known and there is a reported deposit of alunite. The Snake River Canyon area has not been investigated by this department. A portion of the Homestead District which is described under Baker County extends into Wallowa County, and names of mining properties of this portion are listed at the end of this chapter.

A geologic reconnaissance map of the main Wallowa Mountain area was prepared by the De-

partment following completion of field work of the State Geological Survey the past summer (1938). Copies of this map can be obtained at Department headquarters or at either State Assay Laboratory, Baker or Grants Pass, Oregon.

#### ANDY HEAVERNE CLAIMS (Copper) Wallowa Range District

Location: About 13 miles south of the town of Joseph, just east of the west fork of the Wallowa River, in sec. 31, T. 4 S., R. 45 E. (unsurveyed). The claims are below the Frasier property, and are reached by the trail up the west fork of the Wallowa River.

Topography: Characteristically rugged as in other properties of the district.

Geology: The property is on a limestone-granodiorite contact which shows considerable chalcocopyrite, together with epidote. The line of contact is irregular and the tactite zone is of less extent than that of Frasier's. The limestone has an east-west strike with a steep dip to the north.

Remarks: No assay values are available.

Ref. Parks & Swartley, 16:117

#### ARMSTRONG GROUP, PLACER CLAIMS (Gold, Silver) Imnaha District

Owner: Edward Miller, Wisdom, Montana.

Location: On the Imnaha River above the Porcupine group and above the Coverdale Guard Station.

Geology: The area is one of flat glacial fills, containing small-sized gravels generally. The country rock is greenstone and greenstone conglomerate. There are bedrock sills every few hundred yards, so that, in plan, there are narrow places, making the average width not over 300 yards. The depth of gravel has not been determined. Some drilling has been done and depth is known to be over 75 feet deep. The gold seems to be concentrated near the surface and is not in the body of the gravel. Whether or not there are bedrock concentrations has not been determined.

Informant: Department reconnaissance.

#### BROOKLYN GROUP (Copper, Gold, Silver) Wallowa County, Homestead District

Described under Homestead District, Baker County.

CONTACT MINE (Peacock Property)  
(Molybdenum)

Wallowa Range District

Owner: Anna May Schaeffer, Lostine, Oregon.

Location: In sec. 24, T. 3 S., R. 43 E., on the east side of the Lostine River above Lapover. The property is reached by means of the mountain road south from Lostine along the Lostine River to Lapover; thence by trail about 3 miles.

Area: 10 patented lode claims.

History: Discovery was in 1906-1907. \$30,000 is reported to have been spent on the property.

Topography: Rough and steep slopes with elevations up to 8,700 feet.

Geology: A tunnel, 385 feet long, bearing N. 25 E., crosscuts a contact between metamorphosed siliceous sediments and marble at 7,130 feet elevation, exposing a mineralized zone about 10 feet wide. Between an east drift and the face of the crosscut an aplite dike was cut. The contact zone shows a fair amount of molybdenite, together with pyrite, epidote, and garnet.

About 300 yards west of this first tunnel, at elevation 7,040, a second tunnel was driven directly on the contact for 75 feet. The contact strikes about S. 75 degrees E. and dips S. at about 80 degrees. It is only slightly mineralized with small amounts of malachite, chalcantite and limonite.

Several shallow prospect tunnels expose the contact at progressively higher elevations. A nearly vertical pyroxenite dike from 5 to 40 feet wide, striking E. and W., cuts diagonally across the limestone. Development work in this dike shows a rather sparse mineralization of pyrite, pyrrhotite, and chalcopyrite along fracture planes. The dike rock is dark green in color, with a dense texture; and thin sections show its composition to be about 75 per cent augite pyroxene, 15 per cent labradorite, 5 per cent biotite, and 5 per cent quartz. Garnet and epidote occur in greater proportion near the borders of the dike but also show in portions of the adjacent limestone in which little metallization exists.

Remarks: The quantity of molybdenite exposed in places warrants further development.

Informant: Department reconnaissance.

Ref. Parks & Swartley, 16:70

COPPER GEM GROUP (Mountain Gem Mine)  
(Copper, Molybdenum)  
Wallowa Range District

Owner: H. T. Green and associates, Joseph, Oregon.

Location: On Adams Creek in S. ½ sec. 6, T. 4 S., R. 45 E., unsurveyed. It is reached by trail from the head of Wallowa Lake via the W. fork of Wallowa River. Green's cabin is a little over a half mile up Adams Creek from its junction with the W. fork.

Area: 9 claims.

History: The ground was located in 1906 by Green and Adams. A company called the Copper King was formed in 1907 or 1908 but became defunct. In 1921 the ground was relocated by Greene and associates. In 1915 production was given as \$426 obtained from 14 tons of ore.

Topography: Rough and mountainous. The elevation of Greene's cabin is approximately 5,800 feet.

Geology: The area covers a granodiorite-limestone contact. There are aplite and basalt dikes together with pegmatitic phases of the granodiorite, containing quartz masses and large flakes of biotite. Contact minerals such as garnet, epidote and magnetite are common. No. 2 tunnel at 6,150 feet elevation is driven 25 feet on a quartz mass barren of metallization. Above and east of this tunnel an aplite dike cuts limestone and a 5-foot vertical band of garnet is developed. Northeast around the hill the most recent workings on a limestone-granodiorite contact are now caved. The mineralization is in the igneous rock with contact-metamorphic minerals developed widely. Metallization consists of disseminated pyrite, chalcopyrite, and molybdenite associated with calcite and quartz. Above the granodiorite is some 50 feet of banded hornfels with limestone interbeds and overlain by limestone. Fluorite has been reported found in limestone boulders.

Farther up Adams Creek and to the south, the old Copper King tunnel, now caved, was driven 300 feet. There are copper minerals exposed but no molybdenite.

Equipment: At No. 2 tunnel there are hand tools, a small compressor, a gas engine, jackhammer and drill steel.

Remarks: More development is necessary in order to show the extent of metallization.

Informant: Department reconnaissance.

Ref. Swartley, 14:70

**DONNELLY GROUP (Gold, Silver, Lead)**  
Wallowa Range District

Location: About 1 mile south of Minam Lake in sec. 31, T. 4 S., R. 44 E., (unsurveyed). It is reached by the road up the Lostine valley and the trail on the west fork.

Topography: Mountainous and rough with elevations around 8,500 feet.

Geology: The country rock is granodiorite which is cut by porphyry dikes, one of which is 20 to 30 feet wide. For a width of 8 or 10 feet in this dike, irregular quartz veinlets have been deposited in a shattered zone together with veinlets of sulphides. Galena, tetrahedrite, sphalerite, and a small amount of chalcopyrite occur in stringers up to an inch or so wide. High values in gold and silver are reported.

Remarks: A sulphide ore in this locality would need to be high grade in order to make it economic in such an inaccessible location.

Ref. Swartley, 14:87

**ELECTROLYTIC MINE (Gold, Copper)**  
Snake River District

Location: A few hundred feet above the stream, on the Oregon side of the steep Snake River Canyon in sec. 3, T. 1 S., R. 50 E. The property is about 65 miles south of Lewiston, Idaho, 7 miles above Dry Creek and 2 miles below Sommers Creek.

Geology: The region shows altered basic volcanics (greenstones) cut by quartz veins, and capped by recent basalt. Originally the greenstones may have been andesites. A sparse pyrite mineralization occurs along filled fissures and fractured zones. The main vein averages 8 to 10 inches in width and occupies a fissure striking N. 10 degrees to 20 degrees W., with a nearly vertical dip. On the western side of this vein is a fault breccia 4 to 5 feet wide, probably post-mineral. The vein was traced on the surface for several hundred feet in a narrow gorge formed by erosion of the vein outcrop. In 1914 a crosscut tunnel had been driven towards the vein 600 feet without reaching it.

Remarks: No assay values were available at the time of the reconnaissance in 1914. Surface indications were not considered favorable.

Ref. Parks & Swartley, 16:89

**EUREKA MINE (Copper)**  
Snake River District

Location: On the Oregon side of the Snake River in about sec. 14, T. 3 N., R. 50 E.

Owners: H. S. Reed and associates, Lewiston, Idaho.

Geology: No up-to-date information available. In 1913, Stevens Copper Handbook stated "Lands: 40 claims; patents applied for, but secretary reports (1913) property idle for several years, awaiting railway facilities."

Ref. Parks & Swartley, 16:92

**FRASIER PROPERTY (Molybdenum, Tungsten, Copper)**

Wallowa Range District

Location: On the high ridge which separates the headwaters of the Imnaha and west fork of the Wallowa Rivers, in the center of the N. ½ sec. 12, T. 5 S., R. 44 E. The property is about 18 miles south of the town of Joseph and is reached by about 6 miles of road and 12 miles of trail along the west fork of the Wallowa River.

Topography: The area is very rugged with the elevation of the ridge just above the claims at 8,700 feet, well above timber line.

Geology: According to Hess and Larson in U. S. G. S. Bull. 725-D, a thick series of alternating marbles, quartzites, and schists have been intruded by a large body of quartz diorite. About a semicircular block of marble a few hundred feet across, nearly surrounded by the quartz diorite, there is a tactite zone from a few feet up to 20 feet wide, and the adjoining diorite has been metamorphosed to a considerable extent. The tactite has abundant brown garnet with a less proportion of green epidote, quartz and calcite. Green hornblende and chlorite are abundant locally. Also titanite, apatite, scheelite, together with the sulphides pyrite, chalcopyrite, and molybdenite are associated with fractures in the tactite and to a less extent in the adjoining eruptive. There are same quartz lenses rich in scheelite along the borders. A picked sample on the west side of the ridge panned 17 per cent of WO<sub>3</sub>, but two grab samples from the tactite panned only a trace of WO<sub>3</sub>.

Remarks: The deposit is believed by Larson to be at least as promising for scheelite as for copper or molybdenum.

Ref. Hess & Larson, 21:308

Parks & Swartley, 16:95

**GREAT NORTHERN MINE (Gold, Silver)**  
Wallowa Range District

Location: Near the head of Copper Creek in sec. 23, T. 4 S., R. 43 E., and about 2 miles west



of Minam Lake. It is reached by the way of the Lostine River trail.

History: Ore is said to have been taken out on pack trains at some time in the past.

Topography: Characteristic rugged glaciated surface ranging up to 8,800 feet in altitude.

Geology: The country rock is biotite quartz diorite with basalt flows. A caved tunnel said to be 200 feet long was driven on a 2 feet quartz vein. Chrysocolla was in evidence, together with much sericite and iron-stained talcose material. The wall rock shows considerable copper stain. On the northwest side of the saddle there are similar veins from 1 to 14 inches in width with a small amount of copper metallization. Other prospect holes show specular hematite. Some ore is reported to have high values in gold and silver.

Informant: Department reconnaissance.

#### GYLLENBERG CLAIMS (Lead, Zinc, Gold, Silver)

(Hecla Consol. Mining Co.)

Wallowa Range District

Location: About 9 miles southwest of Joseph, on the west side of Hurricane Creek in sec. 21, T. 3 S., R. 44 E. It is reached by the Hurricane Creek trail to about a mile south of the mouth of Falls Creek, and is from 1,500 to 2,500 feet above and west of the trail at this point.

Topography: Mountainous and rough, ranging above and below 7,000 feet in elevation.

Geology: This is an area of blue-gray crystalline limestone or marble which has exposures of superimposed metamorphosed sediments. Both types of metamorphic rocks have been cut by ap-lite and basaltic dikes, as well as by lamprophyric dikes which are somewhat lens shaped in form and parallel to the banding of the marble. These lamprophyres contain about 5 per cent pyrite. Occurring in the marble are small, lenticular-shaped bodies of sulphides, principally galena and sphalerite, lying with their long axes generally parallel to the bedding, and varying in size up to less than a foot wide by several feet long.

Remarks: No assays are available. In such a locality ore would need to be high grade to overcome the transportation handicaps.

Ref. Parks & Swartley, 16:118

#### IMNAHA MINE (Gold) (Winchester Mine)

Snake River District

Location: About 400 feet from Battle Creek and one mile from its junction with the Snake River. It is in sec. 10, T. 3 S., R. 49 E., about 25 miles north of Homestead and 40 miles east of the town of Joseph. Roads from Joseph and Enterprise lead to within four miles of the property.

Geology: The Handbook of Mines of the Min. Res. of Oreg., page 128, quotes from the Portland Telegram of Feb. 1, 1916, as follows:

"This gold mine, also known as the Winchester mine, from S. L. Winchester, one of the men active in its development, is located in sec. 10, T. 3 S., R. 49 E., about 400 feet from Battle Creek, which empties into the Snake River about one mile below the mine. The mine is 25 miles north from Homestead and 40 miles east from Joseph, the railroad terminus, from which a good wagon road goes to within 4 miles of the property.

"A tunnel 1,000 feet long is now being run. The vein is three and one-half feet wide. There are 4,000 feet of tunnels, shafts and crosscuts in the property now. Battle creek is but 400 feet from the property, and the mill is operated by a 50-horsepower Pelton wheel. The buildings are large enough for a plant handling 50 tons each day. The present mill handles 10 tons daily. There is also a sawmill and complete buildings for our employes. The concentrates assay \$300 to \$500 per ton. We have 50,000 tons of ore blocked out."

The above quotation is from a reported interview with S. L. Winchester in Portland Telegram of February 1, 1916. The property has not been visited.

Ref. Parks & Swartley, 10:128

#### LE GORE PROSPECT (Gold, Silver, Copper, Molybdenum)

Wallowa Range District

Owners: Joe Le Gore, Stanley Le Gore, Joseph, Oregon.

Location: Near the head of Falls Creek in (probably) sec. 7, T. 3 S., R. 44 E. It is reached via about 5 miles of road from the town of Joseph up Hurricane Creek and about 2 miles of steep trail up Falls Creek, rising about 2,500 feet above Hurricane Creek.

Topography: Mountainous and rugged at around 7,600 feet elevation.

Geology: The claims cover a contact between granodiorite and marblized limestone. In the contact zone occur garnet, epidote, quartz, and calcite, together with chalcoppyrite, pyrrhotite, and in the claim farthest north, molybdenite. The metallized deposit is 4 to 8 feet wide, has a general north-south strike, and dips about 60 degrees west. Considerable minor block faulting is apparent. The best ore showing is in a surface cut where chalcoppyrite and pyrrhotite are abundantly disseminated in altered granodiorite. The ore is about 4 feet wide and is said to assay \$9 in gold, \$2 in silver, and \$10 in copper (1914). There are 12 open cuts and one tunnel driven about 200 feet in granodiorite.

Ref. Parks & Swartley, 16:138

#### MANUEL LOPEZ CLAIMS (Copper)

Wallowa Range District

Location: About 3 miles north of the Andy Heaverne Claim in (probably) sec. 18, T. 4 S., R. 45 E., on the west fork of the Wallowa River and about 10 miles south of the town of Joseph. The property is reached by means of a road from Joseph for 5 miles plus 5 miles of trail.

Geology: The claim covers a contact similar to that described under the Andy Heaverne Claim, and shows a similar mineralization. Development is reported as consisting of a short adit and a few surface cuts.

Ref. Swartley, 14:79

#### METZGER PROPERTY (Molybdenum, Tungsten)

Wallowa Range District

Owner: E. E. Metzger, Joseph, Oregon.

Location: On Little Granite Creek which flows into Hurricane Creek about 4 miles by road west of the town of Joseph. The property is in sec. 5, T. 3 S., R. 44 E.

History: The deposit was discovered Sept. 20, 1937.

Geology: A lower open cut at 7,100 feet elevation has very little mineralization. About one and one-half miles up Little Granite Creek from Hurricane Creek at 7,600 feet elevation there is an open cut on the point of the ridge showing a contact between bluish-gray marble below and granodiorite above. The tactite zone has hard fine-grained quartzose rocks with garnet and epidote, and contains spotty molybdenite. The width of the tactite zone is about 8 feet but not all of this carries values. Besides molybdenite, the ore con-

tains some scheelite. Descending the northeast ridge from the property, the rock horizons are as follows: limestone at 7,600 feet hornfels at 7,000-6,400, limestone at 6,400, greenstone 5,700 feet to bottom.

Informant: Department reconnaissance.

#### NORTHWEST LIME CO. (formerly Black Marble and Lime Co.)

Wallowa Range District

Owner: Northwest Lime Co., James Cole, Atty., 801 Couch Bldg., Portland, Oregon.

Location: The quarry is in sec. 19, T. 2 S., R. 44 E., and about 6 miles southwest of Enterprise. It is reached by a narrow mountain road which has been used in hauling stone to the kilns on a siding of the Union Pacific R. R. near Enterprise.

Area: Approx. 320 acres.

History: Originally the property was called the Oregon Black Marble Co. The Black Marble and Lime Co. was organized in 1925 and it is reported that \$325,000 has been expended on plant and development. Recently the name has been changed to Northwest Lime Co. Total production up to June, 1931, has been reported at about 7,000 tons of lime. There has been a small output since that time. The company also owns a quarry site on the Lostine River.

Topography: The deposit is on the steep forested northeast slope of the Wallowa Range at about 6,000 feet elevation.

Geology: These beds are supposed to be a continuation of the limestone exposed along the Lostine River. The stone is a dense black rock containing white calcite splotches of probable fossil remains. Polished faces have a beautiful mottled appearance unsurpassed by any of the imported marbles. The well-defined beds vary in thickness from two to six feet, strike about N. 35 degrees W., dip about 10 degrees SW., and are overlain by a thin flow of basalt. No high quarry face is possible because of excessive overburden and underground mining would be necessary for the bulk of the deposit. A tunnel has been driven and a large chamber stoped. An analysis of the stone as given by Moore in U. S. G. S. Bull. 875 follows:

SiO <sub>2</sub>	2.07%	Na <sub>2</sub> O	0.14
Al <sub>2</sub> O <sub>3</sub>	.30%	K <sub>2</sub> O	.14
Fe <sub>2</sub> O <sub>3</sub>	.21%	SrO	.71
MgO	2.18%		
CaO (lime)	94.25%	Total	100.00

The heavy timber and overburden make estimates of reserves difficult. Parks (14) states that the outcrop is from 50 to 500 feet thick and may be traced about 1,000 feet west of the quarry.

Development: The underground work has been mentioned. The surface plant consists of a small housed compressor and three small bunkers. The plant at Enterprise includes three stack kilns with a hydrating and packing plant. Rated capacity is 10,000 tons of quicklime annually.

Remarks: The stone yields a high-quality lime but, because of high transportation costs, the product has difficulty in competing in the larger centers of population. However, because of the beauty of the polished marble, there should be a wide market for the latter product, a market now supplied by out-of-state stone and imported marble.

Ref. Moore, 37:130  
Parks, 14:30  
Hodge, 38:172

#### PORCUPINE GROUP PLACER CLAIMS

Imnaha District

Owners: H. T. Greene and associates, Joseph, Oregon.

Location: On Imnaha River mostly below Coverdale Guard Station for about 3 miles.

Area: 720 acres.

History: The ground was located in 1929. There has been no production.

Development: Consists of open cuts and shafts, the deepest of which is 13 feet. Bedrock has not been reached. A ditch 1½ miles long leads from Skookum Creek.

Remarks: There are warm summers and cold winters, with the working season of from 90 to 100 days, the country being isolated for the balance of the year. There is plenty of water from Imnaha River and Skookum Creek.

Informant: Department reconnaissance.

#### ROYAL PURPLE MINE (Copper)

Wallowa Range District

Location: On Royal Purple Creek in sec. 33, T. 3 S., R. 45 E. It is reached by the way of the Aneroid trail on the east fork of Wallowa River and Royal Purple Creek trail at the P. P. & L. dam.

Geology: In this locality granodiorite has intruded interbeds of marble and argillite. The property is on a contact between crystalline limestone and metamorphosed sediments, and the usual contact metamorphic minerals are developed. An

adit at elevation 5,950 feet in NW. ¼ of SE. ¼ of sec. bears N. 30 degrees E. in metamorphosed sediments for a distance of 118 feet. At 25 feet from the portal, a crosscut 25 feet long bears S. 80 E. An aplite dike near the portal bears N. 70 E., and dips 50 degrees NW. A sparse dissemination of metallic sulphides is reported.

Informant: Department notes.

#### SCHOLL'S (LOUIS) PROSPECT (Gold, Copper)

Snake River District

Location: The property is in sec. 3, T. 1 S., R. 50 E., about 3 miles southwest of Temperance Creek (Brockman's ranch) and in the Snake River Canyon about 1,700 feet above the river.

Topography: The area is characteristic of the rugged Snake River Canyon with the prospect at about 3,200 feet elevation. The country is timbered especially above this elevation, and grazing is reported excellent.

Geology: The area contains limestone, greenstone, and metamorphosed sediments, all intruded by acid porphyry. These rocks are overlain by loosely consolidated gravels, which in turn are overlain by basalt. There are many outcrops of contact deposits containing magnetite, epidote, and quartz and some of them are as much as 100 feet in width. They have a general strike of about N. 80 degrees E., and dip nearly vertically. Limestone especially shows replacement in the contact zone. As reported in 1916 development consisted of two short tunnels, in one of which 4 feet of pyrite is exposed, together with masses of intergrowths of magnetite, pyrite and chalcopyrite.

Remarks: Development did not permit a determination of the size or shape of the deposits, and no assay values were available.

Ref. Parks and Swartley, 16:200

#### TENDERFOOT PROPERTY

Wallowa Range District

Location: About a mile on the Cornucopia trail from the top of the divide above Aneroid Lake in sec. 33, T. 4 S., R. 45 E.

History: Prior to 1914 a company engaged in an extensive and questionable stock-selling campaign to exploit this property. Considerable capital was raised and expended, but little of it was used for mine development.

Geology: Marble and siliceous metamorphosed sediments are interbedded. A tunnel shows black

limestone with quartzite interbed containing a liberal amount of disseminated pyrite.

Ref. Department notes.  
Swartley, 14:73

**WALLA WALLA GROUP (Copper, Molybdenum)**  
(Seeber Mine)

Wallowa Range District

Owner: Charley Seeber, Joseph, Oregon.

Location: At Aneroid Lake in sec. 21, T. 4 S., R. 45 E. It is about 13 miles south of Joseph, and is reached from Joseph by 6 miles of road and 7 miles of trail.

Topography: Typical Wallowa Mountain topography, with the elevation around 7,000 feet.

Geology: This area covers a contact between crystalline limestone and intrusive granodiorite. Immediately southwest of the cabin near the lake, a tunnel 100 feet long, follows a tactite zone S. 50 degrees E. This zone is about 20 feet wide but the granodiorite is more or less altered for a greater width. Typical contact-metamorphic minerals occur with the individual crystals of garnet and epidote ranging in size from very small up to three-quarters of an inch in diameter. The limestone contact shows silicification. Chalcopyrite, chalcocite, and molybdenite are irregularly disseminated in the tactite zone. Small spots of chalcocite surrounding molybdenite were seen. The contact zone in the wall of the south side of the lake basin shows these sulphides in both the altered granodiorite and recrystallized limestone, with a greater concentration in the latter. Garnet, epidote, and quartz occur in fine-grained intergrowths. At one place where the contact is cut by a north-south-trending lamprophyre dike, itself containing considerable pyrite, chalcocite is concentrated in the tactite zone near the dike.

Ref. Parks & Swartley, 16:231

**WALLOWA COUNTY MINING AND DEVELOPMENT CO (Gold, Copper) (Williams Mine)**

Wallowa Range District

Location: On Lick Creek in (probably) sec. 3, T. 5 S., R. 46 E., about 13 miles south and 6 miles east of the town of Joseph. It is reached by a 25 mile road from Joseph.

Geology: The deposit is reported to be a quartz vein carrying gold-bearing chalcopyrite.

Ref. Parks & Swartley, 16:232

**WHITE EAGLE MINE (Molybdenum, Tungsten)**  
(Dr. Scott Claims)

Wallowa Range District

Owner: W. C. Sturgill, La Grande, Oregon.

Location: About 14 miles south of the town of Joseph by the way of Hurricane Creek.

Area: 17 claims, 9 of which are patented.

Geology: The property is reported to be on a granodiorite marble contact which contains molybdenite and scheelite with some gold.

Informant: W. C. Sturgill, La Grande, Oregon.

**WILMOT PROPERTY (Molybdenum)**

Wallowa Range District

Owner: H. T. Green, Joseph, Oregon.

Location: SE.  $\frac{1}{4}$  of SW.  $\frac{1}{4}$  sec. 10, T. 4 S., R. 44 E., on the south slope of the Matterhorn. It is reached from the town of Joseph by the Hurricane Creek trail.

Topography: Mountainous and rough at an elevation of about 7,300 feet.

Geology: A prospect tunnel in a tactite zone shows disseminated molybdenite in garnet. The contact is between limestone and granodiorite and the mineralized portion is about 4 feet wide. There is a possibility of disseminated finely-divided molybdenite in the limestone.

Remarks: There are favorable indications which warrant further investigation and development.

Informant: Department reconnaissance.

**YELLOWBIRD GROUP (Gold)**

Snake River District

Owner: E. J. McManus, Imnaha, Oregon.

Location: On Imnaha River, T. 5 S., R. 47 E. It is reached by the way of Coverdale Guard Station.

Area: 2 placer and 3 lode claims.

History: In 1918 there was production of about \$300.

Geology: The placer ground is glacial-morainal material. It has not been drilled, but there are several test pits, one 30 feet deep. The gold is local and resulted from erosion of the red "porphyry" (granite boss). No gold is found away from the river banks. About 100 yards of material has been placered. There is about 1 mile of ditch. Development of the lode claims includes 3 tunnels 80, 40, and 20 feet long, about 100 feet apart along the river bank. These tunnels are in argillite and along contact with "porphyry". No vein quartz or sulphides were seen.

Informant: Department reconnaissance.

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