

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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Portland, Oregon

Bulletin No. 14-B
Grant, Morrow, and Umatilla Counties

Oregon Metal Mines Handbook

By the Staff

Bulletin No. 14-A—Northeastern Oregon—East Half
No. 14-B—Northeastern Oregon—West Half
No. 14-C—Southwestern Oregon
 Vol. I —Coos, Curry, and Douglas Counties
 Vol. II—Jackson and Josephine Counties
No. 14-D—Northwestern Oregon
No. 14-E—Central and Southeastern Oregon

1941



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FOREWORD

The Handbook of Oregon Metal Mines is being issued in the form of a series of separate bulletins. This one is the third of the series and covers Grant, Morrow and Umatilla Counties. As a matter of fact, it may be said to cover the western half of the territory commonly referred to as "Northeastern Oregon". Inasmuch as many of the properties mentioned in this bulletin are inactive and their workings inaccessible, it has seemed desirable to include herein published data on them from former reports with the object of making available to engineers and other readers of the bulletin information gained from previous investigations. All properties of record within this area of Oregon and classed as mines or mining prospects are mentioned in the bulletin.

In the Introduction some general information on geography, geology, and mineral production figures, is given.

The Department is making every effort to complete the series of bulletins of the Oregon Metal Mines Handbook. With nearly two thousand mining properties and prospects known in the State, this job will not be finished for another year or two. It is, nevertheless, the policy of the Department to issue as promptly as possible information on mining properties in those sections of the State not covered by volumes of the Mines Handbook already published.

Earl K. Nixon, Director

Portland, Oregon,
November, 1941.

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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 the manufacture of clay products and Portland cement is among the important industries of the state. Oregon 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 state. 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 Eastern or Central 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 Cascade 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 Cascades and the Coast Range, 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 live stock. It will be noted thus 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 railroad, 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. 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 transcontinental 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 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 State's road system comprises 52,639 miles, of which 45,607 miles are on the county road system, and 7,032 miles on the State Highway system. The State Highway system comprises 4,745 miles of primary highways, of which 4,373 miles are surfaced. The State secondary highway system comprises 2,287 miles, of which 1,668 miles are surfaced. The total cost has been over \$250,000,000 since 1919. By means of this road system, most mining districts are quite 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 or later 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 Upper Tertiary lavas, volcanic tuffs and conglomerates, shales, sandstones, etc. These overlying rocks have been intruded in places by masses of partly or wholly crystalline rocks. 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 pushed up 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 uplift 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, Steen mountains, and others in eastern Oregon. When disturbance 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.

HISTORICAL GEOLOGY

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.

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 percentage, which refers to the percent 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 Wallowas $\frac{1}{2}$ to 1 million years ago (or even more recently).

MINING AREAS IN EASTERN OREGON

It has been the custom to refer any mining property to a so-called mining "district" for its legal location. No absolute boundaries have ever been outlined for these districts, with the result that any miner who had a property located somewhere between two more or less adjacent districts could not determine with assurance in which one his property lay.

In order to provide definite limits to the various regions in which mining and prospecting are conducted, while at the same time retaining as many of the old terms as possible by which the districts have been known, the term "area" is used in this volume to define and include various known "districts". These "areas" adjoin and are laid out so that no unclassified land lies between them. The term "district" is thus restricted to certain portions of the area where custom has established usage. Each area is named after the most familiar district included within it.

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

Major Divisions	Minor Divisions	Some Events in Eastern Oregon	Some Events in Western Oregon
	Recent	Lowest gold placers	Lowest gold placers and gravels
		Volcanic ash and tuff	Cascade volcanoes
Quaternary 1%		Glaciers	Conglomerates and gravels around
Man			Portland
	Pleistocene	Diatomite	
		Later gold placers	Quicksilver deposits
	Pliocene	Later rimrock lavas	Cascade lavas & granodiorite with
			some copper, lead and zinc
Tertiary 3%	Miocene	Beginning of building of Cas-	
Mammals		cade volcanoes	
		Columbia river basalt flood	Columbia river basalt floods
	Oligocene	Fossil beds of John Day river	Fossil beds of Willamette Valley
			Limestone as at Markham and Dallas
	Eocene	Old gold channels	Old gold channels of southern Oregon
			and commercial coals as of Coos Bay
	5%:Cretaceous		
		Intrusion of granites and for-	Fossil beds of the Rogue River area
Mesozoic 11%:3-3/4:	Jurassic	mation of gold veins, molyb-	Intrusion of granite and formation
Reptiles	% :	denum and tungsten	of gold & other metalliferous veins
		Limestones and argillites	Chromite and serpentines
	2-1/4:Triassic	of Wallowas and elsewhere	
	% :	Greenstones of copper belt	
	3%:Permian		Limestones, argillites & greenstones
	6%:Carboniferous	Elkhorn Ridge argillites	Older schists and slates
Paleozoic 30%:			
Amphibians	4%:Devonian		
		Burnt River schist?	
Fishes	3%:Silurian		
			Older schists?
Shellfish	7-1/8%:Ordovician		
	6%:Cambrian		
Pre-Cambrian 55%			
Almost no life			
- Formation of the Earth -			

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 beds, - rocks 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-metals, 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 - 1934-1939, inclusive.

<u>Year</u>	<u>Metals</u>	<u>Non-Metals</u>	<u>Total</u>
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	3,284,000	Estimated (5,500,000	8,784,000
1939	3,831,000	(5,500,000	9,331,000

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

The most important non-metals 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 may also 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 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 '60's 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 of the entire state.

Placer Deposits

The first gold mining in eastern Oregon was at Griffin gulch, a few miles southeast 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 9 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 1939, the last year for which complete figures are available, the production from the six counties, for all metals, was \$2,774,286.

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 north part of the same county; the High Grade district in southern Lake county, 80 miles west of Pueblo Mountain, near the California line; the Howard district in north-eastern 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 Coast range mountains in Curry and Josephine counties.

The total production of copper in Oregon to December 31, 1939, as given by the United States Bureau of Mines, is 24,104,000 lbs. The mine production for 1939 is reported to be 96,000 pounds.

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 1939 was 30,000 pounds. This production came from three counties of the state with Baker county producing the greatest amount.

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 1882 Oregon has produced about 58,000 flasks of quicksilver with a total value of about \$6,050,000. Of this amount, nearly 55,000 flasks, or about 94 percent, was produced in the past fourteen years. According to the U.S. Bureau of Mines, 1940 production was 9,043 flasks. For several years Oregon has been second among the states in quicksilver production.

Deposits occur in the western, central and southeastern parts of the state. 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, 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 Waldo 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 (saxonite), 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 Big 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 River valley field in Jackson county, and the John Day field in Wheeler, Gilliam, Morrow, and Grant counties.

PART B

Grant, Morrow and Umatilla CountiesGENERAL STATEMENT:

This volume describes mining properties in the northeastern part of the State, covered by Grant, Morrow and Umatilla Counties, and is supplementary to Part A which included Baker, Union and Wallowa counties. In Part A, Baker County is by far the most important in point of metallic mineral production; in Part B, Grant County holds a similar position. Morrow and Umatilla Counties are mainly agricultural and in both, mineral production is practically all sand, gravel, and crushed rock for road building purposes.

No mining properties are listed in Umatilla County, although the U.S. Bureau of Mines records for 1940 show a small gold production from one placer in this county.

County areas are shown in the following table:

	<u>Acres</u>	<u>Sq.Miles</u>
Grant	2,892,800	4,520
Morrow	1,296,000	2,025
Umatilla	2,949,920	3,203

According to the United States Bureau of Mines, 1940 production of gold, silver, copper and lead in the three counties was as given below:

<u>County</u>	<u>Mines Producing</u>		<u>Gold</u>		<u>Total</u>	<u>Silver</u>	<u>Copper</u>	<u>Lead</u>	<u>Totals</u>
	<u>Lode</u>	<u>Placer</u>	<u>Lode</u>	<u>Placer</u>					
Grant	17	24	283,920	858,935	1,142,855	40,973	1,130	1,400	1,186,358
Morrow	-	2	-	420	420	1	-	-	420
Umatilla	-	1	-	595	595	2	-	-	595
Totals	17	27	283,920	859,950	1,143,870	40,976	1,130	1,400	1,187,373

Other than those metals given above, probably the most important metallic mineral in the three counties is chromite, occurring mainly in the Strawberry Range south of the John Day Valley in Grant County. Insofar as is known, there was no commercial production of chromite in 1940. In 1939 about 100 tons of ore was shipped from the Dry Camp Mine.

Possibilities of producing cobalt at the Standard Mine are being investigated by the U.S. Vanadium Corporation.

Production of non-metallics in the three counties is all from sand, gravel, and crushed rock for construction purposes. In 1940, value of production of the three counties amounted to over \$310,000. Total mineral production of the three counties in 1940 was, therefore, approximately \$1,500,000. Of this amount, Grant County produced about 86 percent.

Mining areas as defined in this volume are listed below, and are outlined on the map in the pocket:

<u>Area</u>	<u>Districts Included</u>
1. Grant County:	
Cable Cove	Cable Cove (northern part)
Canyon	Canyon, Mt. Vernon
Granite	Granite, Alamo, Red Boy
Greenhorn	Austin, Greenhorn (western part)
	New Eldorado
Middle Fork	Middle Fork
North Fork	Desolation Creek, North Fork,
	Trail Creek
Quartzburg	Quartzburg
Silvies	Silvies
South Fork	Murderers Creek, South Fork
Susanville	Susanville
2. Morrow County:	
3. Umatilla County:	Part of North Fork Area in
	T.6 S., R.32,33 and 34 E.

Descriptions of areas together with their contained mining properties follow.

GRANT COUNTY

Geography:

Grant County forms an irregular square with dimensions of about 65 miles in each direction and a total area of 4,520 square miles, which lies athwart the center of the Blue Mountains province of Oregon and includes within its boundaries the Strawberry Range, together with the eastern third of the Ochoco Range, and the western portions of the Greenhorn and Elkhorn Ranges. Elevations vary from 2000 feet on the John Day River to 9600 feet on Strawberry Peak. On the plateau surfaces in the western part of the county elevations average over 4000 feet; in the higher ranges to the east the average is over 6000 feet.

Except for the Silvies Area, the entire county is drained by the John Day River and its tributaries. The largest and most flourishing city is John Day, located close to the geographic center of the county, with a population of over 700.

Rainfall averages from 10 to 20 inches a year, although it rises to over 30 inches in the higher mountains. Temperatures range from 30° to 85° with a mean annual of 50° in the valley.

The higher mountains are well timbered and support a thriving lumber industry as well as being one of the best hunting regions in the west. Deer are so numerous as to be a problem in southern Grant County.

The livestock industry is of major importance with the land in the higher elevations being used for summer grazing and the flat valley bottoms furnishing winter forage for the blooded cattle raised in this region.

Grant County is bisected east and west by U.S. Highway 28; and north and south by U.S. Highway 395, with John Day at the crossing. Mail stages connect with the Union Pacific Railroad at Baker, 97 miles east of John Day. The logging railroad at Seneca, 25 miles to the south, connects with the Union Pacific via Burns to Ontario.

Geology:

The rocks of Grant County include a great variety of types, ranging in age from Upper Paleozoic and including numerous more or less well-defined Mesozoic and Tertiary formations.

Areally, the pre-Tertiary marine sediments and basic intrusives occupy much of the central and southwestern parts of the county south of the John Day river, as well as much of the northeastern part of the county. The northwestern and southeastern quarters are largely covered by Tertiary lavas and tuffs which to a minor extent are found overlying older rocks in the other parts of the county as well.

The oldest rocks in Grant County are probably Paleozoic in age and consist of the greenstone schists and gneissic gabbros or diorites which make up Canyon Mountain and the higher part of the Strawberry Range. Carboniferous (Mississippian) limestones occur near the southwestern corner of the county. The 5000-foot thickness of argillites and subordinate limestone of the Elkhorn Range are of Pennsylvanian (?) age.

The Mesozoic sediments exposed in southwestern Grant County attain a total thickness of nearly 20,000 feet. Part of these are Triassic (in the Field Creek area and east of Suplee), but the greater amount is Jurassic, largely sandstone, shale, with some cherts, grits, conglomerates, and limestones. Old altered sediments also appear near Susanville; north of Prairie City; on the North Fork of the John Day; and south of Granite.

The pre-Tertiary sediments are intruded by ultra-mafic serpentinous rocks both east and west of Canyon City; in the Greenhorn district; and in a band extending southwesterly from Fields Creek for many miles. Gabbroic banded rocks and pegmatites are not uncommon as minor intrusions in the pre-Tertiary rocks.

Granodiorite and related acidic rocks are widespread northeast of the town of Granite, and also appear in lesser amounts near Susanville, west of Greenhorn, and on the North Fork of the John Day River.

Cretaceous sandstones of Chico age are known to occur just west of the Grant County line in the Mitchell and Suplee areas.

The most widespread Tertiary formation in Grant County is the Miocene Columbia River lava, which covers over half the county. Up to 2000 feet of Eocene tuffs, agglomerates, and lavas of the Clarno underlie the basalts in the northwest corner of the county, and along the John Day River north of Dayville; and on the North Fork west of Monument, about 2500 feet of John Day tuffs also appear under the basalts.

Conformably overlying the Columbia River basalts along the John Day River west of Mt. Vernon is a series of some 1000 feet of buff colored tuffs

known as the Mascall formation; these are unconformably overlain in this area by tuffs and lavas of the Pliocene Rattlesnake formation, which may be of the same general age as the Harney formation north of Burns, and the Ochoco lavas south and west of Dayville.

In the upper John Day Valley, between Mt. Vernon and Prairie City, the south side of the valley is made up of a great series of coalescing alluvial fans, made up of gravels derived from the ranges to the south. The river is incised at the north edge of this piedmont, which probably formed in Pleistocene times. Bear Valley and Silvies Valley are also alluviated basins.

CABLE COVE AREA

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 area covers both sides of this divide and is, therefore, in both Grant and Baker counties.^{1/} The Grant County portion (about 9 square miles in area) is included in the NE $\frac{1}{4}$ of T.8 S., R.36 E. The region is drained by the headwaters of the North Fork of the John Day River above Peavy Guard Station.

Cable Cove, from which the district gets its name, is on the Baker County side at the head of Silver Creek, about 10 miles northwest of the town of Sumpter. The district is served 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 amphitheater with steep sparsely timbered slopes. On the west, Baldy Mountain (elevation 8,330 feet) rises with bare, light gray, glaciated outlines. Eastward a number of serrated peaks, a continuation of the Elkhorn Range, form a sharp silhouette.

Although of moderate elevation, considerable snow falls at Cable Cove and is likely to cover the ground for about 6 months out of the year. However, little difficulty is had in maintaining roads throughout the winter.

Geology:

Country rock is largely granodiorite, containing many aplitic dikes. Veins are generally tabular and are formed as fillings in a system of generally parallel fault fissures. Vein matter generally consists of crushed and chloritized granodiorite. In the more important veins, ore shoots are usually near the hanging wall side. Walls of the ore bodies are much altered and show abundant sericite and kaolin. These high-grade lenticular ore shoots are seldom more than a foot in width and consist generally of massive sulphides together with a small quantity of quartz and calcite. In a few places, lower grade ore up to a few feet in width is found bordering the higher grade lenses. Ore minerals are arsenopyrite, galena, chalcopyrite, pyrite, and sphalerite, to-

^{1/} Baker County mining properties are described in Bulletin 14-A, State Department of Geology and Mineral Industries, 1938.

gether with values in gold and silver. Both slopes of the divide are dotted with dumps and prospect holes along the closely-spaced parallel veins which trend 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.

Although it includes the major part of the area of the district, the Grant County portion has only a few mining properties. All of those listed are described from old reports.

MOON ANCHOR MINES COMPANY (Gold-Silver)

Cable Cove Area

Local name: Moon Anchor.

"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 crosscut 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.

Reference: Parks and Swartley 16:154 (quoted).

LAST CHANCE MINE (Gold-Silver)

Cable Cove Area

Other name: This may be same as "Granite Group", in part, Bull.14-A 38:19 (which see).

"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.

Reference: Lindgren 01:675.

Swartley 14:142.

Pardee and Hewett 14:102.

Parks and Swartley 16:139 (quoted).

Hewett 31:14.

Lorain 38:19.

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

Cable Cove Area

"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).

Reference: Parks and Swartley 16:154 (quoted).

CANYON AREA
(Canyon and Mt. Vernon Districts)

Geography:

The Canyon Area includes all the territory in Grant County south of the John Day River and the drainage of the river north of Bear Creek just west of Prairie City to the mouth of the Middle Fork. The Canyon district proper includes all the drainage north to the John Day from Indian Creek on the east to Riley Creek on the west. The Mount Vernon district includes the drainage of Beech Creek and its tributaries.

Nearly all the mines of the Canyon district, both placer, quartz and chromite, lie within a few miles of the town of John Day, situated at the mouth of Canyon Creek. The placers of the boom days lie to the south and east, while the alluvium of the John Day River both above and below the town is being actively dredged at the present time.

The John Day River within this district lies in a wide basin measuring about 18 miles from east to west, and from 4 to 8 miles in width. The lower valley lies at the northern edge of this depression at an elevation of from 3000 to 3500 feet, being slightly incised in the lower edge of the great alluvial fans which slope up southward to the steep escarpment of the east-west trending Strawberry Range. This lower alluvial valley varies from a few hundred yards to about a mile in width.

Canyon Creek cuts sharply through the high Strawberry Range, at a point where extensive mineralization has taken place. The steep slopes of the range are fairly well timbered; its serrated and craggy crests, reaching an elevation of from 8000 to 9500 feet, rise barren of vegetation above the timbered slopes. Canyon Mountain is a lower, somewhat isolated spur just east of Canyon Creek, overlooking Canyon City.

To the north of the river, bare and rounded hills rise more gently to the wooded divide between the middle and main forks of the John Day River.

Geology:

The area north of the John Day River is in large part covered with basalts, except to the east where the older rocks appear in the Quartzburg Area. To the south of the river, the Strawberry Range above the alluvial material

of the basin is composed of pre-Tertiary rocks, with the exception of the eastern end and Strawberry Peak itself, which is made up of a great pile of Columbia River basalt flows (Miocene). The high northern crest of the range, culminating in Bald Mountain, is predominantly peridotite, dunite and serpentine. The extreme headwaters of the streams and the southern crest of the range, however, are composed of diabases, gabbros, diorites, and older sedimentary rocks, mostly slates, limestones, and shales of lower Jurassic and Triassic age.

The southern and western portions of Grant County are in part covered with Tertiary basalts and sediments, but there are large areas of Jurassic and Triassic slates, cherts, and serpentines, as well as some Carboniferous sediments.

Lindgren (01:713-720) discusses the geology of the Canyon district and the more detailed geology of the area has been recently mapped by Thayer (40:78-87).

History:

The placer mines of the Canyon district were discovered in 1862, and in less than a year many thousand miners were at work on the gravel bars of the creek and in the gulches of the surrounding hills. Lindgren (01:717) reports that

"...during the first few years the production was very great, but exact figures will probably never be known. Estimates are made varying from \$3,000,000 to \$5,000,000 a year. In 1865 the product was estimated at \$22,000 a week (Raymond's report, 1870), or about \$1,000,000 a year. In the following year the production was still further reduced, but remained for a long time about \$100,000. The Mint reports for 1883 and 1884 estimate \$87,000 and \$80,000 respectively; for 1890 \$72,000, and for 1891 \$100,000. While the figures are incomplete and untrustworthy, it is scarcely probable that the total production much exceeds \$15,000,000. In 1882 there were 16 hydraulic plants (many of them small) in operation, and two-thirds of the products were derived from Chinese companies".

In 1900 to 1916, when the first dredge was installed, there was little production. Dredges have operated spasmodically since 1915, and in 1937 and 1938 there were two large dredges in operation near John Day.

Canyon Mountain is celebrated for its rich gold pockets, and most of the placer gold of the district is probably derived from its veinlets. With the exception of one strike of \$30,000 from the Great Northern Mine in 1895, individual production has been small.

The dunite-peridotite belt along the upper slopes of the Strawberry Range contains the largest deposits of chromite found in the state. During 1918 alone almost 13,000 long tons of ore was shipped from this district, and the deposits with one or two exceptions have been developed only to very shallow depths. Chromite in the Canyon Area has been described by Westgate (21:37-60), Allen (38:53-69), and Thayer (40:87-113).

AJAX MINE (Chromite)

Canyon District

"The Ajax mine is in the SE $\frac{1}{4}$ sec.16, T.14 S., R.33 E., 1000 feet above Indian Creek. The workings consist of three open cuts about 25 feet long and 40 feet apart. The chromite occurs in several lenses that range in size from 2 by 3 by 4 feet to 3 by 15 by 12 feet and are arranged in echelon in a narrow dunite zone in olivinite, the long axes of the lenses being parallel to the dunite contacts. The ore includes spotted and nodular types in which conspicuous linear banding has been produced by fracturing and elongation of the chromite nodules. The spotted ore, particularly in the southernmost cut, fingers out into the dunite in a series of irregular cones extending parallel to the linear banding, which trends N.80° E. and pitches about 50° E. The ore on the dump is reported to contain 35 to 41 percent of chromic oxide."

Reference: Thayer 40:103 (quoted)
Allen 38:65

ALLEN PROPERTY (Placer)

Canyon District

Canyon Area

According to the September issue of the Oregon Mining Review: "At Canyon City, practically in the backyard of County Judge John Allen's home, Charles Freeze is driving a drift to cut the old channel of Canyon Creek under the hill. The tunnel is in nearly 200 feet, passing through hard cement gravel. Mr. Freeze is confident he will strike the original pay channel of the creek which was deposited before the gold was deposited along the present course of the stream. Gold was first discovered on Canyon Creek in June 1862, and for a number of years it was known as one of the richest placer gold camps of the West."

BALD EAGLE DEPOSIT (Chromite)

Canyon District

"The Bald Eagle deposit is 1000 feet northwest of the Chambers mine, at a 6100-foot altitude, in the NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.13, T.14 S., R.32 E. . . . The chromite occurs in banded, spotted, and nodular ore, in which the nodules average three-eighths of an inch in length and about three-sixteenths of an inch in thickness. The south end of the ore body, although badly shattered, is clearly intrusive into an inclusion of diorite that belongs to the basement complex. The banding in the chromite is essentially perpendicular to the diorite contact, and the juxtaposition of the chromite body and the inclusion seems accidental. The contacts of dunite and ore show abrupt transitions; the surrounding country rock is olivinite. The average exposed thickness of ore is about 5 feet, and the ore appears to be of good milling grade".

Reference: Thayer 40:104 (quoted)
Allen 38:62

BECHTEL AND HALL PLACERS (see Marysville Placers)

BLACK VELVET DEPOSIT (Chromite)

Canyon District

"The Black Velvet claim is about 750 feet northwest of the Iron King mine and 50 feet above the road. Figure 15 shows the size and shape of the ore body. The ore is spotted chromite with planar banding that dips parallel to banding in the enclosing olivinite. At the north end the chromite pinches out. Along the fault in the northern trench the spotted chromite

and serpentine have been ground to a streaked gray and brown massive rock that is fully as hard as the adjoining serpentized olivinite. Elsewhere the contacts are gradational. Ore with a vertical thickness of 6 feet is exposed in the north trench, and the limits of the body were fairly accurately located in small pits. The ore probably contains between 15 and 25 percent of chromic oxide."

Reference: Thayer 40:100 (quoted)
Allen 38:55

BLANK, JACK (Placer) Canyon District Canyon Area

Press report in the Mining Journal, September 30, 1938, is as follows:

"The Jack Blank group of two placer claims near Canyon City, Oregon, has been leased recently by the Roba brothers. Lawrence Roba, Box 181, Canyon City, is general manager of operations, which include hydraulic mining in the summer and drift placer mining in the winter. The operators intend to install a small dredge and recovery plant to recover the fine gold in the north fork of the John Day River. Roba will design the equipment himself." Inactive in 1940. (H.K.L.)

CANYON CREEK (Placer) Canyon District Canyon Area

Located near Canyon City and John Day. President, V.C. Coe; Secretary-Treasurer, F. C. Hill, 2335 NE 48th Ave., Portland, Oregon. Includes Bogard property, Empire Gold Dredging and Mining property, Gold Hill Placer, Mable Placer, Round Valley Placer, Big Flat Placer, and Blue Rock Placer. Report to Corporation Commission in June 1937; not operating (1940).

CANYON MOUNTAIN MINING CO. (Gold) Canyon District Canyon Area

"Other Name: Mountain View Mine.

"Office: Canyon City, Oregon. Jackson Chambers, Pres.; F.S. Slater, Sec.-Treasurer, both of Canyon City. Capital stock \$1,000,000; par value \$1.00; \$810,005 subscribed; \$876,392 issued and paid up. (1916 report)

"This company's property is located $1\frac{1}{4}$ miles southeast from Canyon City, at an elevation of about 4500 feet, some 1200 feet above the town. The country rock is greenstone and the deposit is in many ways similar to that of the Great Northern mines, elsewhere described. There is a persistent ledge a few feet in width with small stringers roughly parallel approaching the main ledge at an angle of 45° , in which there is frequently found specimens so rich that this company concluded that all the rock could be quarried and milled so as to produce from \$3 to \$5 per ton in free milling gold. In the fall of 1914 their 10-stamp mill, built during the summer, was operated for a short time, but apparently results were disappointing. The development consists of one tunnel about 500 feet long, which is 300 feet away from the main ledge above referred to. The property has been almost idle since 1914."

Reference: Parks and Swartley 16:50-51 (quoted)

According to Clint Haight, Clyde V. Nunes, of Canyon City, is the owner. H.K.L. 11/13/40.

CELEBRATION (Chrome)

Canyon District

Canyon Area

"Located on the east fork of Big Pine Creek, 500 feet south of the creek and trail, at the three-mile trail marker, in NW $\frac{1}{4}$ sec.30, T.14 S., R.33 E., Grant County.

"The country rock is a yellow-weathering dunite, varying locally to a pyroxenite, gabbro, or, more commonly, serpentine.

"The orebody is from 5 to 8 feet thick, possibly thicker in places, and extends for at least 50 feet in length, dipping 25° SE into the hillside, and striking N.65° E. It is rather irregular in outline, being considerably jointed and faulted in blocks up to 4-5 feet across. Often the ore is unfaulted with blocks of serpentine and dunite.

"Two large open cuts about 20 feet apart expose the ore-face and one incline goes down into the ore for 35 feet.

"The ore is of the nodular type, consisting of round aggregates averaging 5mm. in diameter, in a matrix of green pyroxene. It is quite uniform in grade. An average of 60 chip samples from the piled ore and from the exposed faces of the orebody assayed 40 percent chromic oxide.

"This deposit is now relatively inaccessible. The nearest roads are three miles distant along a gently graded trail down Big Pine Creek, or one and a half miles by steep trail over the ridge to the Chambers mine.

"From the end of the present road it is another three miles out by a third-class road which joins the highway, at a point midway between John Day and Prairie City".

According to Clint Haight, a survey for a proposed road to the property has been made. This road will be a continuation of the present one. It will be three miles long, have a maximum grade of 8 percent, and will cost approximately \$1500.

About 200 tons of 38 to 40 percent chrome ore have been stock piled.
H.K.L. 11/13/40.

References: Allen 38:59 (quoted)
Thayer 40:104-5.

CHAMBERS MINE (38) (Chromite)

Canyon District

Canyon Area

"The Chambers Mine is at an altitude of about 6500 feet on the northwest end of Bald Mountain, in the southeast corner of sec.13, T.14 S., R.32 E. The mine is 13 miles by road from John Day, 8 miles of which is dirt road. Mining operations began in June 1918 and total production was probably about 6000 tons. The ore shipped averaged 30 to 33 percent of chromic oxide. All ore under 28 percent, which included about one-fourth of the total ore mined, was discarded. Practically all ore shipped was mined from the glory hole shown on plate 14. The sample trenches and diamond drill holes were made by the Bureau of Mines.

The ore is mainly coarse spotted chromite in dunite that grades into massive chromite. In places it shows rude planar banding, best shown in the

southwest orebody, where the bands dip about 70° SE. The matrix of the ore is serpentized dunite, and, as shown in the cross sections, the orebodies are almost surrounded by a shell of serpentized dunite. The ore grades abruptly into the dunite where the contacts are not faulted, and the dunite grades outward into olivinite. Even where the chromite is in frozen contact with olivinite the matrix, between the chromite grains, is dunite. Small veins or dikes of green pyroxene from one-eighth of an inch to $1\frac{1}{2}$ inches wide are common. They are probably genetically related to the larger gabbro and gabbro pegmatite dikes that cut the chromite in the glory hole. The pegmatite contains angular blocks of spotted chromite, and diamond drill hole no. 13 passed through about 10 feet of gabbro that cuts good ore. The gabbro is readily removed by hand sorting during mining. Many small faults cut the ore but thus far have not seriously interfered with mining operations.

"Three major orebodies and some smaller unworkable lenses are known on the Chambers ground. The southwest orebody is a lenticular mass dipping steeply southward and plunging northeastward. Most of the central orebody, which appears to be in the form of a short kidney, probably has been mined out. A tunnel, now caved, under the western edge of the glory hole was reported by Westgate to be in barren serpentine. Diamond drill holes nos. 6 and 10 were barren, which indicates that the orebody does not extend to any great depth. The northeast orebody may consist of two overlapping lenses, but it seems more probably to be one large lens that has been faulted, for faulting at the edge of the ore is evident in cores from drill holes nos. 12 and 16. Between drill holes nos. 13 and 17 the ore either pinches out or is dropped along a fault parallel to the one indicated on plate 14. The average tenor of the ore, judged on the basis of past production and Bureau of Mines assays, is between 20 and 30 percent of chromic oxide."

Reference: Thayer 40:96-98 (quoted)
 Allen 38:60-62
 Westgate 20:47-48

CINNABAR CLAIM (Quicksilver) Mt. Vernon District Canyon Area

"About 8 miles north of Mt. Vernon, on what is locally called Cinnabar Mountain, is a quartz-calcite vein, which is reported to be traceable for a length of several claims. Its width is said to be 3 to 4 feet . . . and quite regular. Cinnabar, the ore of mercury, is found in places in the vein next to one wall. It was prospected in the early placer days and the best grade was retorted in crude appliances and used by the placer miners of Canyon City and vicinity in catching their gold in the riffles. The deposit was abandoned for many years following the decline of placer operations, but the high price of mercury in 1915-16 caused them to be relocated and some development has been done by drifting to search for commercial grades of cinnabar."

No activity (H.K.L. 11/14/40)

Reference: Parks and Swartley 16:55-56 (quoted)

DRY CAMP (Chrome) Canyon District Canyon Area

Location: "On the NW slope of the ridge, at about 4000 feet elevation, in the SW $\frac{1}{4}$ of sec. 8, T. 14 S., R. 33 E.

Geology: "The country rock is more or less serpentized peridotite, apparently varying towards a dunite near the orebodies. Two or possibly more parallel zones of banded chromite occur, both striking N. 55-60° E., dipping steeply

to the south and lying about 220 feet apart.

"The western (lower) zone has been only partly stripped on its surface exposure, and is practically undeveloped. Float appears for over 100 feet, and at the south end ore in place has a total width of 1 foot of high and 3 feet of low grade, in a band about 8 feet wide. The high grade occurs in narrow bands 1-3 inches wide, which strike N.55° E., and dip 60° to the south.

"The eastern (main) workings lie about 230 feet uphill to the southeast. Here a zone of banded ore from 8 to 20 feet in width which has been mined to an average depth of about 10 feet, seems to have averaged at least 2 feet in width for that distance. This zone strikes N.60° E., and dips about 75°-80° S. near the southwest end. Thirty feet northeast from the pit which was opened, the entire zone is 8 feet wide and the zone of highest grade total at least 30 inches in width. At the northeast end the ore-zone is 20-25 feet wide and strikes N.30° E., dipping 45° south. Over the entire distance, the highest grade ore appears to lie nearest the "hanging wall" or south side of the zone.

"Near the northeast end of the working what was apparently a "cross vein" was mined by tunnel extending 80 feet into the hill in a S.60° E. direction. It is said that the orebody was very irregular, varied from 8 to 20 inches in width, was somewhat discontinuous, and sloped upward as the tunnel went in and the ore was stoped down. No ore was seen in the tunnel or face. It is said that 200 tons were removed from this body. Westgate (21:45) gives one interpretation of the structure here.

"From 10 to 20 feet farther to the northeast of the main workings, two shallow cuts expose the extension of the orebody in that direction, making a total ore zone of over well 120 feet.

"One other orebody, probably small but high grade, appears in a small cut 70 feet west of the main workings.

"The ore is nearly all of the disseminated and banded type, occurring in parallel bands which vary in chromite percentage from 10-20 to about 80 percent, and in chromic oxide content probably from 10 to 40 percent.

"The deposit lies about 1 mile by sled road and 3 miles by third-grade road from the highway at a point 3 miles west of Prairie City, and 10 miles from John Day.

References: Allen 38:62-64 (quoted)
Thayer 40:100-102
Westgate 21:45

EVANCE GROUP (Gold)

Canyon District

Canyon Area

Owner and Operator: Charles Mack, Canyon City, Oregon

Area and Location: There are six unpatented claims, the Rosie D, Rosie E, Evance, Bessie L, Bessie D and Snow Bird in the original location. One unpatented claim, the Climax, was located in July 1940. These claims are located on Vance Creek 3/4 miles west of the highway in sec.3, T.15 S. R.31 E.

History: The original claims were located in 1934. Assessment work has been done every year. There has been no production.

Development: Open cut on Rosie D claim and numerous prospect pits on other claims.

Geology: The country rock is schist. The vein varies in width from 14 to 30 inches and consists of a limonite stained quartz. The vein strikes N.70° E. and dips 50° N.

General Description: The country is moderately rugged and wooded. There is enough timber for development work. A small stream, Vance Creek, flows through the claims. Snowfall in the winter averages two feet. The elevation is about 3500 feet.

Informant: Charles Mack. H.K.L. 8/2/40.

FERRIS AND MARCHBANK (Placer)

Canyon District

Canyon Area

Operators: Ferris and Marchbank Placers, John Day, Oregon. J.H. Ferris and J. W. Marchbank, Daly City, California, are operating as a partnership with Ferris as general manager; John B. Smith, superintendent; F. B. Carothers, purchasing agent.

Location: 4 miles below John Day on John Day River.

Area: 335 acres along river, from 120 to 800 feet wide.

History: Operations begun June 1935. Shut down several months in 1937 for repairs. Daily average yardage moved, 6000 to 6500 yards.

Equipment: Bucyrus-Monihan diesel-electric dragline with 4-yard bucket. Walker type. Floating wash plant. One 10B Bucyrus shovel. 5 electric portable welders. Water distillation plant. Caterpillar. One Keystone drill. Dragline--250 h.p. diesel-electric (Fairbanks Morse), 5 cylinders. Wash plant--280 h.p. straight diesel (Fairbanks Morse) 8 cylinders. Four buckets (119 cu.ft. capacity) kept on hand. Teeth are changed every 4 hours. Built up with Hascrome-Manganal rods. Requires 7-10 minutes for change. Twenty-eight man crew. Three shifts with five operators per shift, balance in shop and on surface.

Development: 157 acres mined. Entire area explored with prospect shafts spaced 100 feet apart in lateral lines 100 feet apart. Operations have proved test results within $\frac{1}{2}\%$. Water used: 5000 gals. per minute from Byron-Jackson 10" pump. Mine all year around.

Geology: Flat operation. Bedrock is false--blue clay (6' to 10' deep), most gold near it. Boulders only along shore lines. No test made below blue clay, although gravel is known to be present. Dig about 1' of blue clay. Gold comes originally from Canyon Creek.

Remarks: Wash plant has 25'x32' sluicing area. Testing at present with impact-amalgamator revolving pan. Results indefinite yet. 175 acres still to be mined. Average depth equal to 12'.

Informant: A. V. Quine, 4/26/38.

The Ferris and Marchbank placer was worked out early in the summer of 1940. The Ferris Mining Company is operating a dragline and floating washing plant on Bull Run Creek near Unity, Baker County, Oregon. At present the machine of the above operation is being maintained for the Unity plant.

Informant: H.K.L. 11/15/40.

GREAT NORTHERN MINE (Gold)

Canyon District

Canyon Area

Owner: Isaac Guker, Canyon City, Oregon.

Location: This mine is located about 2 miles southeast of Canyon City on the steep north slope of Canyon Mountain, about 1500 feet above the town, at an elevation of 4700 feet.

History: In 1898 a \$30,000 pocket was extracted from one of the seams in a surface cut on this property. Prospecting operations have since been carried on rather extensively underground in search of other pockets. A few pockets of much less importance have since been found.

Geology: The country rock is greenstone (gabbro) and diabase-porphyry. A quartz vein 1 to 2 feet thick, striking N and S and dipping 25° W, is practically barren, although it contains pyrite and seams of calcite. Another barrier vein 2 feet wide strikes east and west and dips 35° S. The valuable gold deposits on this, as well as most other properties on Canyon Mountain, are not found in the quartz veins, but rather in quartz-calcite seams, which are quite numerous everywhere. Valuable pockets are occasionally found in quartz seams closely associated with calcite.

Reference: Parks and Swartley 16:111-112.

HACHENEY-JOHNSON (Quicksilver)

Canyon District

Canyon Area

Owners: H. J. Johnson and F. C. Hachenev.

Location: On the northwest side and near the top of Cinnabar Mountain, approximately five miles south of Mt. Vernon, Oregon. The property is reached by a country road which leaves the John Day Highway a short distance west of Mt. Vernon and Riley Creek and extends to the foot of Cinnabar Mountain, on its west side, after which there is a long steep climb up to the claim. Another route to the property is along a country road which leaves the John Day Highway a short distance east of Mt. Vernon and ascends part of the east side of Cinnabar Mountain along Harper Creek.

Area: The property consists of one claim, "The Viewpoint", which was recorded in Canyon City November 23, 1936, and six claims located in November and December 1936, which have not yet been recorded. The westernmost of these contain some timber and a spring.

Geologic Conditions: While few outcrops were encountered on the ascent from Riley Creek to the claims high up on Cinnabar Mountain, the rocks that compose this mountain may be best seen just west of the creek. They appear to be very fine grained basalts and interbedded sediments, the latter having been metamorphosed to argillite and slates. They strike N. 55° W. to S. 55° E., and the dip is vertical. Rocks with practically the same strike and dip underlie the cover of soil and hillside wash on Cinnabar Mountain.

The east vein (which outcrops higher on the mountain) contains the only known occurrence of cinnabar in the area. Cinnabar is reported to have been taken from this vein between 1870 and 1900 by miners who used the mercury to extract the gold in their placer mining operations.

The vein has been uncovered for only a short distance and is about two feet wide where exposed. About 110 feet of tunnel has been dug in the general direction of the strike of the vein, but not exactly on the vein. No cinnabar was seen in this tunnel and only a small speck of the mineral was found on the dump.

Informant: D. K. McKay (10/31/37).

HAGGARD AND NEW (Chrome)

Canyon District

Canyon Area

Location: "On the headwaters of the east fork of Dog Creek, in the northwest corner of sec. 21, T. 14 S., R. 32 E.

Geology: "The country rock is of normal 'buckskin' peridotite, varying to a fine-grained aphanitic dunite, and is relatively unaltered and massive, with widely spaced jointing.

"Two main openings lie about 250 feet apart, one being N.40° W. of the other and almost 60 feet below.

"The lower opening consists of a tunnel and immediately superjacent open cut running into the hill S.70° E. for 65 feet, along what appears to have been a zone of low-grade ore perhaps 2-4 feet wide and nearly vertical. At the end of the tunnel a 30-foot raise reaching to the surface, is said to have extended along a high-grade (46 percent chromic oxide) shoot of ore 4 by 6 feet across, cut off on the east by a vertical N.10° W. trending fault.

"Up the hill to the southeast lie the main workings. Here considerable work was done during the war, including a tunnel into the hill trending S.30° E. for 80 feet, thence N.20° E. for 50 feet, with a 15-foot winze at the turn. At this point there is evidence of stoping and square setting above, extending to the surface. Another tunnel 30 feet above the first lies just above one of the stopes and trends approximately south for 50 feet.

"Small kidneys of high-grade, apparently striking northeast and dipping 45° to the northwest, make up the ore which was mined. The main zone, which includes both deposits and another cropping of small stringers 150 feet farther up the hill to the southeast, trends northwest.

"The ore in the small kidneys is of rather soft, friable chromite with very little gangue. These are said to have run over 45 percent chromic oxide. The ore also occurs in larger disseminated bands which may not reach 30 percent in grade.

"The mine is reached by a third-class road, now much in need of repair, or by sled road from down creek. It is located at an elevation of 3000 feet above the valley about 4½ miles from the highway at a point about midway between John Day and Prairie City."

References: Allen 38:58 (quoted)
Westgate 20:48

HAIGHT CLAIM (Gold)

Canyon District

Canyon Area

Owner: Clint Haight, Sr., Canyon City, Oregon.

Location: Sec.7, T.14 S., R.42 E. This lies on the NE. spur of Canyon Mountain about 1000 feet below the Great Northern Mine.

Area: 1 unpatented lode claim located in 1915.

History: Production from the surface was considerable in the early days.

Produced \$500.00 in 1938 as a one-man operation.

Equipment: Cabin and mining tools.

Geology: Numerous narrow quartz veins striking N.35°W. and dipping 60° E. lie 6 inches to 2 feet apart and average 4 inches in width, in a country rock of diorite or similar material. The vein matter is composed of broken and comminuted quartz in a matrix of either soft loose hematite mud or hard hematite, recemented by drusy calcite. Gold occurs in small pockets usually less than a foot in diameter but often containing up to several hundred dollars in a few pounds of ore. Most of the vein material shows only traces or is entirely barren. Pockets apparently occur in places where the veins change attitude or at intersections of two veins. There are no sulphides. The gold is uniformly wiry and hackley.

Development: The surface around the tunnel entrance has been gophered to a

depth of 15 or 20 feet for nearly 200 feet, and numerous small high-grade bunches have been removed.
Informant: Clint Haight, J.E. Allen (10/15/38)

HANENKRAT'S (Chrome) Canyon District Canyon Area

"At Hanenkrat's the rock is identical with that of the Ray mine. The country rock is a black serpentine. The ore body, which has been practically worked out, was wedge-shaped, 4 feet wide at the top, narrowing to 1 foot at a depth of 15 feet, below which it was not followed. The ore carried 30 to 40 percent of chromic oxide."

References: Westgate 21:43 (quoted)

HOWARD PROSPECTS (Chromite) Canyon District Canyon Area

"The Howard prospects are 3500 feet northeast of the Dry Camp mine, near the center of sec. 8, T. 14 S., R. 33 E. The upper of the two principal prospects is a T-shaped open cut with the bottom of the T pointing northward. Small lenses of massive chromite and irregular masses of pyroxene occur in partly sheared and serpentized dunite. Most of the ore contacts are faulted. The lower opening is a 75-foot trench along a chromite body trending N. 25° W. The main part of the cut is 35 feet long, 4 to 12 feet wide, and 10 feet deep. The ore forms a veinlike stringer of spotted and massive chromite in an irregular body of dunite, which grades into the olivinite country rock. The distribution of chromite in the ore and of pyroxene in the olivinite suggest linear banding and are remarkably similar. About 10 tons of low-grade ore is on the dump".

References: Thayer 40:107-108 (quoted)
Westgate 21:46-7.

IRON KING MINE (Chromite) Canyon District Canyon Area

"The Iron King mine is at an altitude of 5400 feet, in the SW $\frac{1}{4}$ sec. 18, T. 14 S., R. 32 E., on the west slope of the northwest spur of Canyon Mountain. The mine is served by a dirt road, 5 $\frac{1}{2}$ miles long, from Canyon City. The workings, which consist of an open quarry, a tunnel, and small open pits, are shown on plate 15.

"Mining at the Iron King deposit began in 1916, and 500 tons of ore was shipped by the end of the year. About 3000 tons was shipped annually during 1917 and 1918, making the total production approximately 6500 tons. The ore was hand-sorted, and there are now several hundred tons of low-grade ore in the dump. The shipping ore averaged about 32 percent of chromic oxide.

"The ore at the Iron King mine is fine-grained spotted chromite in a matrix of serpentine derived from dunite. The ore is banded and gradates all the way from massive black ore containing, according to Bureau of Mines analyses about 43 percent of chromic oxide to barren serpentized dunite. Although planar banding is most apparent in the quarry face, dump specimens show well-developed linear banding. The primary, magmatic character of the banding is still evident despite serpentization and complex faulting. Mainly because of such complex faulting, the distribution of the ore, as shown on plate 16, is very irregular. The dunite mass in which the ore occurs is surrounded by olivinite in which irregular bodies of peridotite and pyroxenite occur. These

"pyroxenic masses are related to the pyroxenic border facies of the ultra-mafic rocks, and about 200 feet south of the mine a large east-west block of gneissic basement complex is included in the olivinite. The main contact of the intrusive mass with the basement complex is about 1600 feet south of the mine. Small veins of magnesite occur in the serpentine, and large crystals of aragonite occur in open fractures in the chromite.

"The ore body in the Iron King deposit appears to be a nearly horizontal tabular mass, which is bounded laterally by faults and has been broken into several blocks that rise northward in a series of steps. The apparent dip of the banding in the individual fault blocks exposed in the quarry face is less than 15° NW. or SW., the dips in adjoining blocks being commonly in opposite directions. The chromite is cut off on the west by a fault that strikes N. 40° E. and dips 41° SE. The footwall of this fault forms the west wall of the quarry and was penetrated at a depth of 56 feet in diamond drill hole no. 24. The southeastern edge of the ore body is faulted against sheared and slickensided serpentine in the quarry face, and the northeastern limit of the ore-bearing block is probably a fault that brings serpentized dunite against peridotite and pyroxenite. Drill hole no. 29 reached the hanging wall of a breccia zone containing fragments of chromite ore at a depth of 63 feet, and from this fact and the surface exposures it is inferred that the fault trends about N. 50° W. and dips 50° NE. The small chromite blocks exposed southeast of the main ore body appear to be in the breccia, and the highest chromite exposure northwest of the quarry lies close to the northwesterly projection of the fault, on the footwall side. The intersection of the breccia zone with the footwall fault presumably determines the northwesternmost extension of the ore-bearing block. The total width of the ore in the quarry face is 115 feet, and the total exposed thickness ranges between 10 and 25 feet. The chromite exposed in the quarry floor is a thin band dipping 10 or 15° toward the quarry face. The tunnel east of the quarry is in barren serpentine, and no indications of minable ore were found southeast of the quarry or below the quarry level. The record of shipments indicates that the ore averages 25 to 30 percent of chromic oxide (Cr_2O_3), including low-grade ore thrown on the dump."

References: Thayer 40:98-100 (quoted)
 Allen 38:55
 Westgate 20:49-50.

JOHN DAY PLACERS
 (See Marysville Placers)

Canyon Area

KINGSLEY MINE (Chromite)

Canyon District

Canyon Area

"The Kingsley mine is in the $\text{SE}\frac{1}{4}\text{SW}\frac{1}{4}$ sec. 9, T. 14 S., R. 32 E. in the headwaters of Dog Creek, about 5300 feet above sea level. The mine was operated from November 1, 1917, to November 1919. The 200 tons of ore shipped in 1918 averaged 45 percent of chromic oxide; some assays are reported to have run as high as 49.78 percent. The ore consists of black to spotted chromite and forms irregular bunchy stringers, from a few inches to 5 feet wide, in a dunite zone in olivinite. The stringers, which are essentially parallel, strike N. 50° W. and dip 60° NE. The zone has been explored about 100 feet along the strike and 35 feet vertically by an open cut and four tunnels. Imperfectly banded spotted ore was found in a prospect pit 50 feet southwest of the main workings."

References: Thayer 40:106 (quoted)
 Allen 38:56-58
 Westgate 20:51

MARKS & THOMPSON MINE (chromite)	Canyon District	Canyon Area
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"The Marks & Thompson mine is in the northern part of the SW $\frac{1}{4}$ sec.10, T.14 S., R.33 E., about 300 feet above Indian Creek. The mine was operated from November 1916 to August 1917, and 400 tons of 30-percent chromic oxide ore was shipped. . . ."

". . . The ore consists of rather low grade spotted chromite in which both planar and linear banding are developed parallel to the walls of the ore body, which dip 40° to 50° SE. At contacts that are not fault contacts the ore grades abruptly into the olivinite country rock. Although three prominent faults cut the ore body, the ore is comparatively massive. The entire surface extent of the chromite body is not exposed, and ore may extend some distance beyond the northwestern side of the open cut. If movement on the northern transverse fault were normal, so that the northern segment of the ore body was dropped, the total reserve may be several thousand tons. The southern end of the mine appears to be worked out. The chromite in the trenches to the northeast is much faulted and is noteworthy mainly in that it shows that other chromite deposits of minable size may be present. The average tenor of the ore is probably between 15 and 25 percent of chromic oxide".

References: Thayer 40:102 (quoted)
 Allen 38:65-66
 Westgate 21:44

LAST CHANCE (Placer) (See St.Maries Placers)		Canyon Area
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MARYSVILLE PLACERS	Canyon District	Canyon Area
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Other names: John Day Placers, Beckett and Hall Placers.

Location: 1 $\frac{1}{2}$ miles east of Canyon City, on Long, Windless, Rich & Quartz Area: 1600 acres--840 under lease, 760 deeded (gulches.

History: A large area was hydraulicked in the heyday of early placer mining on the John Day River. Present activity consists of working old tailings, also virgin ground, with giants and washing plant with stated capacity of 500 cu.yds. per day. Operated by Beckett and Hall in 1938. Inactive at present.

Past Production: Not available; all involved in figures of John Day (Canyon) district. Total for district probably about \$15,000,000.

Water Rights: 40 miners inches purchased from Hillas ditch, cost \$200, plus 4% of gross returns; two other ditches under lease and bond (40 miners inches). Present plans call for reservoir system to operate 6-8 months. Water from Strawberry Range. Season from April 15 to July 1.

Equipment: 3 giants, 2-#1, 1-#2; 2000 ft. of 7 in. to 15 in. pipe; pressure at pit 200 lbs., Long gulch 80 lbs., washing plant 45 lbs. (Scattered over property).

Gravel reserves: 1/3 mined; ground has been greatly dissected by previous operations, leaving areas of virgin ground surrounded by pits and sluiceways; pit test said to prove 5,000,000 cu.yds. from 15¢ to \$1.90; operators expect gravel to average 50¢ to 60¢; no actual averages taken.

Geology and elevation: 3000-4200 ft.; country rock serpentine and altered gabbroic rocks; gravel size head and smaller; 2-6 ft. overburden on virgin ground; beds probably formed in back eddy of Quartz gulch at its confluence with ancient south fork of John Day. Quite likely gold came from Canyon Mtn.

area through Quartz gulch and tributaries; coarse gold found in Marysville pit; also medium sized grains to fine; 900 fine.

Informant: A. V. Quine (3/30/38); H.K.L. 10/30/40

MARYSVILLE MINING CO. (Gold)

Canyon Area

Owner: C. L. Roddick, Canyon City, Oregon.

Location: Sec. 6, T. 14 S., R. 42 E., 1 mile east of Canyon City.

Area: 4 unpatented placer claims.

History: Originally located in the 1870's. Worked for the last two seasons and \$2500.00 recovered from about 3,000 yards.

Equipment: 450 ft. of pipe (40 ft. fall) number 1 giant, 10 miles of ditch.

At the present time the water belongs to the farmers, and the miners get only the surplus.

Geology: Gravel is up to 10 ft. in depth composed of cemented boulders which must be blasted, lying upon a serpentine bedrock. The boulders are highly oxidized in part and soft. They range in size up to 3 or 4 ft. in diameter, but average 3 to 5 inches in diameter. Gold is found throughout the gravel, not alone lying on the bedrock. It is all quite coarse, smooth, and rounded. It is 880 fine. The ground averages about \$1.00 per yard. The gold originated from the Canyon Mountain pockets to the south.

Informant: C. L. Roddick, via J.E.A. 10/15/38.

MILLER MOUNTAIN MINE (Gold)

Canyon District

Canyon Area

Owners: Neil Nivin and Orin L. Patterson, both of Canyon City, Oregon.

Location: SE $\frac{1}{4}$ of sec. 22, T. 14 S., R. 31 W., 5 $\frac{1}{2}$ miles from Canyon City and 1 $\frac{1}{2}$ miles from the highway. The elevation of the Miller Mountain property varies from 4675 feet at the camp to 5380 feet above sea level (aneroid) at uppermost workings. It is located on the east slope of Miller Mountain, which is the partial watershed of Canyon Creek and is sparsely timbered with white pine, fir and scrub mahogany. Ample timber is on the property for all immediate needs.

Area: 5 unpatented lode claims; Pittsburg #1 and #2; Guernsey; Last Chance; and Fraction.

Geology: There are several distinct veins of true fissure type on the Miller Mountain property. The significant development to date has been on a steep pitching vein having an approximate strike of N. 45° to 65° W. with a dip of 75° to 85° NE, and a vein having approximate strike of N. 65° W. and dip of 45° to 50° NE. The country rock is a gabbro or diabase porphyry in which well defined veins of quartz (frequently barren) accompanied by a complicated system of seams occurs. The gold (mostly free) occurs in these seams (frequently in pockets) in quartz or calcite. A ribbon structure (bluish quartz mostly on the hanging wall side of the vein), due to shearing, is very pronounced throughout most of the length of the veins. There has been only slight movement during mineralization, as is evidenced by the infrequent occurrence of slickensides. Post mineralization faulting has taken place to some extent as shown by the sugary condition of the quartz (in places) which is the chief gangue material. Numerous small irregular veinlets cut the argillite of the hanging wall. The main vein quartz shows considerable comminution with many minor slickensides. High grade ore chutes rise from the vein into the hanging wall and widen as they go up to form pod-like lenses. The gold is said to accompany chalcopyrite (green stain is an indicator of high grade ore).

Development: There are several upper tunnels. The main tunnel, or Powell tunnel, is 800 ft. long. The Fraction tunnel is 400 feet long, and the Last Chance tunnel 1800 feet long. Stopping on the steep vein extends for well over 500 feet in many places. Altogether, there are about 4000 feet of workings. The extent of the development on the property consists of discovery cuts on each of the claims, surface cuts, or trenches tracing the different veins; two incline shafts 40 feet and 90 feet in depth respectively on the steep vein; a vertical shaft 105 feet in depth connecting the top of the #6 raise (which is on the flat vein) with the surface of the Last Chance, the Fraction, the Pittsburg, and Mill Site tunnels; also 3 tunnels on the Pershing claim; a 30 foot raise off the Last Chance tunnel, nine raises, the aggregate footage of which is approximately 850 feet and two winzes, 34 feet and 5 feet in depth respectively, off the Pittsburg tunnel, besides other minor development which does not materially enhance the present value of the property.

The Last Chance tunnel, approximate elevation of portal 5275 feet (aneroid) has been driven through the diabase porphyry dike a distance of 310 feet. Several veins were encountered, the flat vein being 215 feet from the portal of the tunnel which is the vein the Pittsburg tunnel has been driven on. 150 feet from the portal of the tunnel the steep vein was encountered. This vein, which strikes N.45° to 65° W. and dips 75° to 85° N.E. was drifted upon for 270 feet. In the first 120 feet the vein showed persistency; but was insignificant from this point to the face, a distance of 150 feet.

The portal of the Fraction tunnel, the approximate elevation of which is 5250 feet (aneroid) is 410 feet east of where the steep vein was encountered in the Last Chance tunnel, and has been driven a distance of 930 feet. This vein which is an easterly extension of the vein discussed in the Last Chance tunnel, is a well-defined fissure vein in a fracture of the diabase porphyry having an approximate strike of N.45° to 65° W. with a dip of 75° to 85° NE. The two incline shafts 40 and 90 feet respectively on the steep vein could not be inspected because of caved ground.

The portal of the Pittsburg tunnel, the approximate elevation of which is 5000 feet above sea level (aneroid) is 490 ft.E. and 150 ft.N. of the portal of the Fraction tunnel and is 250 ft. lower in elevation than the Fraction tunnel level. The Pittsburg tunnel was driven on a strong wide flat-dipping quartz vein in a fracture in the diabase porphyry having an approximate strike of N.65° W. with a dip of 45° to 50° NE for a distance of 280 feet, at which point the vein has been split by a tongue of the dike and the hanging wall quartz stringers have been followed from this point to the face of the tunnel, a distance of 570 feet. These stringers are rather insignificant in places, being not more than 0.5 ft. to 1 ft. wide for 150 ft., then widening out to as much as 10 ft. of practically barren white quartz, then pinching out again to almost nothing. The Mill Site tunnel has been driven 83 feet in the diabase porphyry dike.

Two of the tunnels on the Pershing claim are caved and could not be inspected. The middle Pershing tunnel has been driven on a flat vein a distance of 15 ft. No samples were taken.

Equipment: Outside: cars, tracks, and 250 ft. wire rope tramway, blacksmith shop, boarding houses, etc. Mill: Schramm gas compressor, 1 cylinder diesel (can run only 5 stamps), 1 inch grizzly hand fed to crusher, 12 inch Dodge type crusher run by Ford Model A engine, 45 ton bin, two 5-stamp batteries,

two 5x12 ft. amalgamation plates. Water from a spring is collected in two 10-ft. tanks, and is sufficient for only 5 stamps. Copper clogs the amalgamation plates in spite of use of metallic sodium and cyanide solutions.

Informants: G.E.Lowell; J.E.Allen, 10/14/38
G.G.Hogg report, 5/13/35.

According to the Oregon Mining Review (9/40): "Robie Brothers, Canyon City, have taken a lease and option on the Miller Mountain mines, near Canyon City, from the owners, Neil Niven and Orin Patterson, both of Canyon City. Ore from the upper levels will be treated in the 10-stamp mill which has been overhauled and repaired. The main drift in the mine is about 800 feet long, and from this drift there are seven raises in ore".

MORGAN (Chrome)

Canyon Area

"At Morgan's claim thin sheets and irregular bands of chromite, aggregating 2 feet, occur through a width of 10 feet. The bands bear N.30° E. and can be followed along the hillside for 250 feet. The adjoining rock is more or less sheeted parallel to the ore bands. The ore bands show to a depth of 10 feet, below which they have not been followed. Besides the bands there are some larger irregular masses. The country rock here is a dull dark-green aphanitic rock. The microscope shows it to be largely serpentine, within which lie cores of unaltered olivine. The original grains of olivine reached 1 centimeter in diameter. A few grains of chromite, the largest 1 millimeter across, with crystal outline, and a very few irregular grains of diopside of about the same size, are the only other original minerals. Besides the serpentine secondary magnetite occurs in minute grains, a few of which show crystal form. The original rock was composed of olivine, with a little diopside and chromite, and was a dunite".

Reference: Westgate 21:43 (quoted).

NORWAY AND SMITH & GEITSFIELD MINES AND PROSPECT

Canyon Area

"The Norway and Smith & Geitsfield mines, in the NW $\frac{1}{4}$ sec.3, T.14 S., R.31 E., were described by Westgate, but the lode deposits on the Norway ground had not been mined at the time of his visit.

"The Smith & Geitsfield produced 48 tons of 35 percent chrome ore in 1917, and the Norway mine produced 922 tons of ore containing more than 40 percent of chromic oxide (Cr₂O₃) in 1918. Four principal bedrock deposits were mined at the Norway, the largest of which is shown in figure 19. The ore ranges from massive high-grade to spotted low-grade chromite and includes some nodular ore. The chromite contacts are slickensided, and in one opening the chromite is sheared out in small lenses along a fault zone. The dumps contain about 400 tons of low-grade ore averaging 15 to 25 percent of chromic oxide and about 10 tons of higher-grade ore probably averaging 35 percent of chromic oxide. Not more than 50 tons of ore is visible in the ground.

"At the prospect southwest of the Norway, in the NE $\frac{1}{4}$ sec.8, two shafts were sunk 25 feet apart along a shear zone in pale-green serpentine. The zone trends N.75° E. and dips 60° S. Spotted chromite is found on the dump as thin flaky pieces as much as half an inch thick, and it is inferred that the ore occurred in thin irregular bands, possible as schlieren".

"At the Norway mine, 2 miles west of Canyon City, mining consists in recovering float from the surface dirt. The cover, which is about 2 feet thick, is all moved, and the float is saved. Spotted ore running less than 30 percent of chromic oxide is thrown aside; only the black ore, averaging 45 percent, is kept. Over 1000 tons of float has been recovered from the 3 acres worked; some 30 acres of promising territory remains unworked. The method in use has been locally termed 'digging potatoes'.

"As the loose mantle rock is worked, the outcrops of veinlike bodies at the surface of the bedrock are noted and saved for later mining. These lie in two belts, which make a V opening to the north. The west limb, followed for 600 feet, bears N.35°-35° W. and dips steeply west; the east limb, half a mile long, bears N.20°-40° E. and is vertical. The adjacent rock is a shattered serpentine, though the outside barren rock, both within and without the V, is solid, basic, and less serpentinized. The ore in the serpentine occurs in veinlike or lenslike bodies, which contain from 26 to 47 percent of chromic oxide; the average of the better lenses is about 42 percent. Veins of aragonite cut the serpentine.

"About 1800 feet north of the Norway workings is a vein-shaped body of chromite, which bears N.45° E. and dips 60° S. The south wall is a massive coarse-grained serpentine; the north wall a crushed serpentine. The body has been followed for 200 feet and is 2 feet in maximum thickness but averages between 8 and 10 inches. Some side stringers of chromite occur in each wall particularly in the south wall."

References: Thayer 40:110-111
Westgate 21:49 (quoted)

PROSPECTS WEST OF PINE CREEK (Chromite) Canyon District

Canyon Area

"The prospect pits west of Pine Creek, in the center of the S $\frac{1}{2}$ sec. 11, T.14 S., R.32 E., reveal small chromite bodies enclosed in a lens of unshattered dunite, which is nearly 2000 feet long and 200 to 400 feet wide. The dunite itself is enclosed in olivinite. The contacts between the two rocks are rather well exposed and indicate that the dunite strikes northwestward and dips 20° to 30° NE. The chromite forms only small irregular lenses, and no minable ore is exposed. The outstanding feature of the deposits is a band of spotted chromite between one-half inch and 3 inches thick, which is exposed near the upper end of the dunite mass. This chromite band is traceable continuously on a vertical rock face for upwards of 40 feet and was followed for nearly 35 feet in a tunnel at right angles to the rock face. The chromite lies parallel to the contacts of the dunite mass and apparently is a schlieren-like body whose lateral extent is great in comparison with its thickness."

Reference: Thayer 40:108 (quoted)

POWERS MINE (Chromite)

Canyon District

Canyon Area

"The Powers mine is on the ridge west of Dog Creek, near the middle of the west edge of sec. 4, T.14 S., R.32 E. The mine was in operation from January 1917 to August 1918, and a total of about 480 tons of ore containing 40 percent or more of chromic oxide was shipped. The ore consisted of about equal parts of high-grade massive chromite containing about 50 percent of chromic oxide and low-grade spotted ore averaging 25 to 30 percent. The workings,

which consist of a series of trenches and open cuts and two tunnels, all on the east slope of the ridge, extend over a horizontal distance of 250 feet and have a vertical range of 50 or 60 feet. The chromite-bearing zone is irregular in thickness, its thickest part being 8 feet wide and its average about 3 feet. The chromite occurs in a dunite band that is little wider than the chromite body. The ore and dunite trend N.50° W. and dip 60° or more southward. Planar banding is well developed parallel to the walls. At the northwest end of the deposit the chromite grains string out into dunite and olivinite. A small amount of fresh enstatite was found in some of the ore."

Reference: Thayer 40:107 (quoted)

PRAIRIE DIGGINGS (Gold)

Canyon District

Canyon Area

"At Prairie Diggings, 3 miles east of Canyon, placers containing rough quartz gold have long been worked. In the same vicinity is reported a large vein of base character and, to judge from specimens, inclosed in slate. In Raymond's report for 1870 it is stated that the body of quartz mixed with country rock is 400 feet wide, and strikes northeast to southwest, and dips 60° SE. In 1872 a mill had been erected and \$10,000 extracted, but soon after this the enterprise was abandoned, the quartz being, it is stated, of too low grade." 1/

Press reports state the following: 2/

"This mine has an interesting history, starting as a placer discovery in 1862 when it was worked by a party of Germans. Among them was the late F.C. Sels who later operated a brewery in Canyon City and amassed a fortune through his investments in eastern Oregon. Mr. Sels often told friends of the extreme richness of the placer mines. He said that for a period of some days their party of four averaged cleanups of several thousands of dollars a day operating only with ground sluice methods. This placer ground originated below an immense body of quartz material some five hundred feet in width and which has been uncovered for a distance of over half a mile in length. After the placer operators had worked out the best of the overburden a young fellow by the name of J. A. Laycock came in to the camp from Virginia City, Nevada, where he had assisted in building and operating mills on the old Comstock Lode. He discovered that the quartz at Prairie Diggings contained gold values that looked worthwhile. Accordingly in the year 1864 he organized a company and built a ten-stamp mill. The first month's run of this mill netted the owners more than \$26,000. The partners then disagreed and the mill was closed down for several years. Again Mr. Laycock reorganized them and another run was made which showed good values. Again two of the partners engaged in a quarrel as to how the mine should be run and it was again closed and the ground divided."

References: 1/ Swartley 14:205

2/ Northwest Mining Journal, April 1935.

PRESENT NEED (Chrome)

Canyon District

Canyon Area

"Located 1000 feet south of the Haggard and New mine and 300 feet higher, in NW $\frac{1}{2}$ of sec.21, T.14 S., R.32 E., Grant County. The country rock is a rather massive aphanitic dunite, somewhat faulted and jointed but not badly sheared.

"A short tunnel and a parallel open cut 10 feet to the west extend due

south into the hill for about 30 or 40 feet, and expose ore 3 or 4 feet wide which appears to strike a little north of west, and which dips gently to the north. High-grade ore (assaying 51 percent chromic oxide) and probably 3 feet thick, is exposed along the strike for at least 15 feet, and for 25 feet along the dip. Some ore is exposed at a lower level and may be another kidney.

"The deposit is located on a very steep slope, 1000 feet from the nearest road (at the Haggard and New). Timber and water are abundant."

Reference: Allen 38:59 (quoted)

QUARTZ GULCH MINING COMPANY (Placer) Canyon District Canyon Area

Owners: The Quartz Gulch Mining Company; C. L. Roddick, operator, Canyon City, Oregon.

Location: sec.7, T.14 S., R.42 E.

Area: 150 acres of unpatented placer claims.

History: This placer was also worked in the 70's and was one of the first claims in the district. It is said that a half million dollars has been taken from this property. The property has been worked every year for the last 40 years.

Geology: This is a gulch placer, the bedrock being porphyry and serpentine. The gold is rough and scattered throughout the gravel. It has a fineness of 880. At the present time a bank 50 feet high stands at the back of the workings. The boulders are abundant and of large size. The gravel runs about \$.20 per yard. Inactive 1940.

Informant: C. L. Roddick. (This property was not visited). J E.A. 10/15/38

RAY MINE (Chromite) Canyon District Canyon Area

"The Ray mine is on the east end of Bald Mountain, at an altitude of 6950 feet, about 2000 feet a little west of north from the southeast corner of sec.20, T.14 S., R.33 E. The mine is 17 miles from John Day by road, 4 miles of which is very steep and rough. The deposit was discovered in May 1918, and some ore was shipped. Westgate reports that the ore assayed 32 to 44.70 percent of chromic oxide. . . .

"The ore body that Westgate described has been mined out except for small masses of low-grade spotted ore, which shows some banding. The chromite is surrounded by a dunite shell, and the country rock is jointed olivinite. The tunnel penetrates about 20 feet of crushed chromite, which may or may not be continuous with the small chromite lens over the tunnel. No ore is exposed in the two prospect pits northwest of the Ray mine." 1/

"A 60-foot prospect tunnel, started at a point 150 feet S. 65° E. from, and 50 feet below, the bunkers, has intersected the ore. The tunnel runs from east to west, and its last 15 to 25 feet exposes a large body of ore. Another pit lies about 500 feet northwest of the main workings (over the ridge). Here a long prospect cut was dug for 60 feet in a N-S direction. Another cut lies 300 feet farther northwest.

"The ore from the tunnel is soft, more or less friable, and rather fine grained. Interstitial serpentine is visible, but usually does not seem to make up more than 15 percent of the ore. Ore from the upper cut is harder, but otherwise similar. Westgate reports 32-45 percent chromic oxide content (21:42).

"The deposit is about nine miles by third-class forest road from the highway, at a point halfway between Prairie City and John Day. The road drops about 3000 feet in this nine miles". 2/

References: 1/ Thayer 40:102-103
2/ Allen 38:64-65
 Westgate 21:42

RAY PROSPECTS (Chromite)

Canyon District

Canyon Area

"Several prospect pits have been dug in small chromite lenses in the west fork of Overholt Creek in the $SE\frac{1}{4}$ sec.10 and the $NE\frac{1}{4}$ sec.15, T.14 S., R.33 E. The relations of the two largest lenses, which are in sec.10, are shown in figure 18. The ore is well-banded, partly massive and partly spotted. It is enclosed in dunite, which grades into olivinite within a few inches from the ore. The other lenses that have been prospected are much smaller. The average tenor in chromic oxide is probably about 20 percent."

Reference: Thayer 40:109-110 (quoted)

REED AND CAMPBELL MINES (Chromite)

Canyon District

Canyon Area

"The Reed and Campbell properties are among the prospects in the $NE\frac{1}{4}$ sec.2, T.14 S., R.32 E., and are indicated on plate 12 by the number (59). The openings are now slumped, and the only visible ore occurs in two 1-inch stringers of spotted chromite in dunite and olivinite at the Campbell prospect."

Reference: Thayer 40:110 (quoted)

SHEEP ROCK DEPOSITS (Chromite)

Canyon Area

Three chromite deposits on Sheep Rock, in prospects called the Hanenkrat, Morgan and Campbell, were described by Westgate, but because of mining since Westgate's visit, there is some difficulty in fitting his descriptions to the present prospects. The Hanenkrat prospect has been renamed the Big Bertha No.1; the Morgan and Campbell prospects were not definitely identified.

"The Big Bertha deposit may be the same as the Campbell claim of Westgate. The ore is exposed in an open cut about 20 feet long, 10 feet wide, and 5 feet deep. The ore is low grade, is spotted, and shows distinct vertical linear banding combined with planar banding striking $N.60^{\circ} E.$ The chromite is in dunite, and although the planar bands feather out lengthwise, the lateral contacts are commonly well defined. In small irregular bunches and stringers of higher-grade chromite that occur outside of the main body of spotted ore, only vertical linear structure is apparent."

Reference: Thayer 40:108-109 (quoted)

SILVER'S (Chromite)

Mt.Vernon District

Canyon Area

"Located 2 miles north of the John Day highway near the west edge of sec. 17, T.13 S., R.31 E.

"The country rock is serpentine, which near the ore and above it is black, but which grades into a yellow dunite below the ore. A north-trending gabbroid dike penetrated by the glory-hole adit lies to the east of the deposit.

There has been considerable faulting and slickensiding, but not enough to make mining too difficult.

"The orebody consists of bands and irregular bodies of chromite which seem to strike about N.60° W. and dip 55° N. The band which lies from 2-5 feet above the main exposed kidney, varies in thickness from 15 inches to 3 feet, and is rather continuous for 30-40 feet. The kidney is very irregular, but it is at least 4 feet thick where it crops at the surface and has apparently been followed by a cut to a depth of 20-30 feet. Ore appears over a horizontal distance of about 75 feet, and the average total thickness may be as much as 10 feet. The deposit is by no means exhausted, since the ore appears prominently from top to bottom in the west face of the glory-hole. It was mined, as has been indicated by an adit which taps the glory-hole at about 30 to 40 feet in depth, and about 700 tons is reported to have been shipped in 1918.

"The ore appears to be of average medium grade, above 30 percent, but probably not over 45 percent chromic oxide.

"The deposit may be reached by a road leading from Mt. Vernon up Buck Creek. It is about 3 miles from the main highway".

Reference: Allen 38:66 (quoted)
Thayer 40:110

ST. MARIE (Placers)

Canyon District

Canyon Area

Owners: W. G. St. Marie and Bessie St. Marie, Canyon City.

Location: 2 miles above Canyon City at Horseshoe Bar on the west side of Canyon Creek above the highway.

Area: 3 unpatented placer claims of 20 acres each extending on both sides of the creek.

History: Placer was worked in the 1860's. It is said that a Mr. Turner ground-sluiced many years ago and recovered \$9,000.

Equipment: Sluice boxes, pipes, and joints. Ditch $3\frac{1}{2}$ miles long, 3500 feet of which is flume, a part of the old Humboldt ditch. Boxes are 32 feet long, 18 inches wide. Block riffles are used. Most of the gold, however, is picked up in the race above the boxes.

Geology: The Bench Placer lies 260 feet up a very steep Canyon wall above Canyon Creek. The bedrock is serpentine and gabbro. Boulders run in size up to 6 feet in diameter, but average less than 1 foot. There is a large amount of sandy soil and fine gravel but no clay. Pieces of gold up to \$16.00 have been found, from \$2.00 to \$5.00 are frequent; but the average is about \$.25 or less. Gold is 875 fine, and the gravel is said to average from \$.10 to \$.40 a yard. It is usually mixed through the gravel, but on the bedrock runs a little higher.

Miscellaneous: This property is on the highway. There is no timber. Its accessibility enables it to work throughout the winter unless the ditch freezes.

Development: a pit 200 feet long, 40 feet wide, and with a 40 foot face has been cut. Mr. St. Marie plans to siphon the water across the highway and work the ledge bars in the "horseshoe", at 100 feet lower elevation. This ground should average well over \$1.00 a yard from the tests made.

Informant: W. G. St. Marie; J.E.A. 10/14/38.

TRACY (Placer)

Canyon District

Canyon Area

Operator: W. W. Tracy, Canyon City, Oregon.

Location: $\frac{1}{2}$ mile up Tracy Gulch, directly west of Canyon City.

Area: 7 full claims along creek and over crest of hill.

Equipment: #1 giant and 450' of 11 inch to 7 inch pipeline.

History: Recent history dates from January 1938, when W. W. Tracy went to work with his giant. About 1000 yards has been moved; cleanup of 19.75 ounces made to date.

Development: No exploration except a few pits; tested by panning.

Water rights: Owns water right from Mill Creek, sufficient until July 1 to run one No. 1 giant at 65# to 70# pressure.

Geology: Old channel which has been eroded, concentrating the gold values in the present stream gravels. Gravel run apparently extends across ridge, depth unknown. Bedrock serpentine; exposed country rock the same. Gravel size of head and smaller except for slough boulders. Very little clay. Gold rather coarse to pinhead size.

Informant: A. V. Quine 3/31/38

WARD MINE (Chromite)

Canyon District

Canyon Area

"The Ward, Kingsley, Howard, Powers, and Big Bertha no. 1 mines and the deposits west of Pine Creek are similar in that the chromite occurs in thin tabular bodies or irregular stringers that appear to be schlieren.

"The Ward mine is in the SE $\frac{1}{4}$ sec. 5, T. 14 S., R. 32 E., about a third of a mile west of Dog Creek. The deposit was first worked in 1916 and was mined out late in 1918. Total production was between 2000 and 2500 tons. About a quarter of this high-grade black ore averaging between 38 and 45 percent of chromic oxide in carload lots; the remainder averaged 31 to 32 percent chromic oxide. Massive black ore, spotted ore, and nodular ore were present. The ore body was a vertical mass about 80 feet long, 70 feet deep, and not more than 10 feet thick. The east end was faulted off against olivinite, and the west end pinched and faded out into barren dunite. The remaining ore in the mine shows well-developed vertical planar banding parallel to the walls. Where exposed in a crosscut trench the spotted ore at the north edge of the ore body grades into 8 feet of barren dunite, which in turn grades into vertically banded olivinite. Evidence of post-chromite pegmatitic activity is revealed by dump specimens that contain brecciated chromite enclosed in very coarse-grained pyroxene."

References: Thayer 40:105-106 (quoted)

Allen 38:55-56

Westgate 20:48

WESTERN DREDGING COMPANY (Placer)

Canyon District

Canyon Area

Operators: Western Dredging Co.; Sanford Lowengart, 650 5th St., San Francisco, president; E. C. Styskel, secretary-treasurer; Walter Williams, dredge superintendent. Address: John Day, Oregon.

Location: John Day River in and near town of John Day.

Area: Area indefinite. Two to four years operation expected in vicinity of John Day; Mt. Vernon area, four to six years more.

History: Began operation November 21, 1937. Moving 6000 yards per day. Area worked by Chinese many years ago has been dredged and the dredge is now in virgin ground.

Geology: Bedrock is false; a bluish clay with no values in it. Gravel overlying of medium size, gold in very fine particles. Yardage per day at present is 5000 cu.yds. 5000 g.p.m. of water used. Average depth is about 22 feet. 17 feet below water.

Equipment: All steel boat designed by Walter W. Johnson. Driven by two 200 h.p. Atlas Imperial diesel engines. Is ladder-type bucket dredge with 72 buckets of 6 cu.yd.capacity. Two dredge sluices with tailing sluice. 90% of values recovered and retained in No.1 sluice, 9% in no.2 sluice, 1% in no.3 sluice.

Informant: A. V. Quine 3/30/38; H.K.Lancaster 11/14/40.

OREGON ASBESTOS MINE (Asbestos)

Mt.Vernon District

Canyon Area

"Office: 201 Stock Exchange Bldg., Portland, Oregon. Joseph Woerndle, president; E. Sturchler, secretary; Otto Berg, treasurer, all of Portland. Capital stock \$5000; par value \$100; all subscribed, issued and paid up. (1916 report).

"This asbestos property is located about 5 miles up Beach Creek from Mt.Vernon, in the northeastern part of T.13 S., R.39 E. It is about 27 miles from the Sumper Valley Railroad at Prairie City. A great deal of activity was reported on this property in the latter part of 1915 and the first half of 1916. Some \$6000 to \$7000 was spent in development work on a deposit containing stringers of chrysotile distributed over a width of 300 feet and a length of 2000 feet. A few tons of asbestos was shipped to market but in June 1916 operations were suspended for a time at least. The quality of the fibre was said to be very fine but was not sufficient to justify the operation of the property."

Reference: Parks and Swartley 16:170 (quoted)

Inactive since 1916. H.K.L.

Colin Campbell, English mining engineer experienced in asbestos, states deposit may be of commercial importance and warrants investigation. F.W.L.

GRANITE AREA

(Granite, Alamo, and Redboy Districts)

Geography:

The Granite area is bounded on the east by the Grant County line, with the exception of a small area near Cable Cove and the Ibex Mine. On the south and west it embraces all the drainage into Granite Creek, with the exception of Lightning Creek and Clear Creek above their forks; and lower Olive Creek, and the headwaters of Beaver Creek. It also includes the Crane and Onion Creek basins lying in T.8 S. R. 35 $\frac{1}{2}$ and the west half of 36 E. The Granite area also includes the old Granite, Bald Mountain, and Redboy districts, the boundaries of which are indefinite.

Granite is the only town in the district. It is 14 miles from the railroad at Sumpter and is reached by a good forest road over the divide, which is about 2000 feet above Sumpter. Granite is 4500 feet above sea level. The area is well timbered and forest roads penetrate to all of the important localities. Deep snows prevail in winter.

Geology:

The geology of most of this area has been mapped by Pardee (41). The rocks of the southern part of the district, including the old Redboy district, are argillite and related sedimentary and metamorphic rocks, probably Carboniferous in age. The argillite continues north along the west side of the Bald Mountain granodiorite batholith, and to the north it is seen in most of the drainage area of the North Fork of the John Day where it is not covered with recent gravels or later lavas. Granodiorite, aside from that of Bald Mountain, continues north on the eastern side of the district to the northern limits of Grant County. A smaller outcrop is also seen in the southeastern part of the district upon the divide between the Granite and Sumpter districts. With the exception of the Monumental Mine, practically all of the quartz mines are found in the argillites. This type is well represented by the Red Boy and the Cougar mines, to which the reader is referred for details.

At the present time dredges are in operation both east and west of Granite, and large areas of dredging ground will be moved in the next few years.

History:

Gold was first discovered in Granite Creek in the fall of 1861 by Eph and Sant Day, according to Pardee and Hewett (14:9). "In 1874 the Monumental and 1877 the La Belleview mines were discovered; rich ore is said to have been shipped from the latter at this early date by pack train a distance of several hundred miles to Umatilla on the Columbia River".

The placers in the Granite Creek drainage were computed to have yielded by 1914 a minimum of \$1,033,000, and there have been two dredges active there since 1938.

The Red Boy has produced nearly a million dollars, the La Belleview mine has produced about \$200,000, the Buffalo-Monitor \$350,000, and the Monumental

\$100,000. The Cougar-Independence is now producing at a rate of over \$200,000 per year, and both the La Belleview and the Buffalo are active.

AJAX (Gold)

Granite District

Granite Area

Owner: J. J. O'Dair Estate, Granite, Oregon.

Location: $\frac{1}{4}$ mile east of the Magnolia; in the center of NW $\frac{1}{4}$ sec.27, T.8 S., R.35 $\frac{1}{2}$ E. About 5 miles north of Granite in Lucas Gulch.

Area: 4 unpatented lode claims and mill site.

History: Worked in 1905-1906, at which time \$40,000 is said to have been taken from the shoot 90 feet long in the upper tunnel.

Development: The workings include a lower tunnel extending several hundred feet northeast with crosscuts to the north; a central tunnel 500 feet long; and an upper tunnel on the "Snowbird" claim also several hundred feet long. There is a 35-foot shaft on the top of the hill.

Geology: There are at least 3 different veins in the property. Those in the upper and lower tunnels dip in opposite directions. Cross veins and cross faults intersect these veins in several places. White decomposed dikes also cut them. The vein system is shown to trend northeasterly. Country rock is argillite. The ore is composed of whitish gray sheared quartz and argillite from less than an inch to not over 2 feet in thickness. The dip and strike varies considerably. There is a large amount of limonite deposition from the vein in the lower tunnel. In the upper tunnel manganese oxides are prominent; in the lower tunnel, limonite predominates.

Miscellaneous: Property is about 5 miles from Granite on a good road and can be reached at any time during the year. Timber is abundant and water is sufficient to support a small mill.

Equipment: About 500 feet of track and 1 car. Formerly there was a 5-stamp mill on the property; it has long since burned down.

Informant: J. J. O'Dair; JEA 9/27/38, 10/6/38.

References: Swartley 14:16
Hewett 31:16
Pardee and Hewett 14:106
Parks and Swartley 16:7

BELLEVIEW MINE

Granite Area

(See La Belleview Mine)

BLACK JACK (Gold)

Red Boy District

Granite Area

Location: in the west half of sec.14, T.9 S., R.35 E., on the west side of Clear Creek, half a mile south of the Red Boy Mine.

Owners: According to Frank Klein the owners are Mrs. T. J. Sheedy, Clarence Merritt, Sue Merritt, and Willis Wall, all of Baker, Oregon.

Area: Three unpatented lode claims located in 1900.

Geology and Development: The main tunnel runs nearly due west for over 3000 feet, and cuts 3 or 4 more or less well defined quartz veins showing rather small values. There is several hundred feet of work on these veins, at the time of the inspection. The end of the tunnel was not reached because of bad air. One 50-foot raise is reported to have been driven in 1934, but

no ore was taken out. Country rock is argillite.

Equipment: Bunkhouse, boarding house, mine car and tracks, and ventilating pipe.

Informants: Alfred Thode, JEA 6/13/39; Frank Klein 9/24/40
Reference: Hewett 31:30.

BLUE BIRD (Gold) Red Boy District Granite Area

Owners: Patt Glenn, Henry Cavin, Granite. No work since 1916.

"Within a radius of a mile of the Red Boy mine there has been a great deal of prospecting, principally in the form of long exploratory crosscut tunnels in some of which veins have been found and small amounts of ore extracted. None appear to have maintained production over considerable periods, and many are so far abandoned that assessment work is not kept up.

"One of these is the Blue Bird mine, which is developed by a crosscut tunnel 2500 feet long and some short drifts extending under the ridge one-half mile northeast of the Red Boy mill in sec.11, T.9 S., R.35 E. The tunnel was not accessible in 1914, but Mr. Walter Gleason, of Baker, stated that during 1904 and 1905 about 1500 tons of ore yielding \$5000 was taken from a vein near the portal. The material on the dump shows a breccia of unaltered argillite cemented by comb quartz, with minor amounts of pyrite and arsenopyrite."

References: Parks and Swartley 16:35 (quoted)
Hewett 31:21,36.

BLUE MOUNTAIN DREDGING COMPANY (Placer) Granite Area
(See Porter and Company)

BLUE RIBBON (Gold and silver) Granite District Granite Area

Owners: Clair Tardiff, 409 West Alta Street, Pendleton; Albert Perard, Granite; James R. Thompson of Pendleton has Power of Attorney.

Location: NW $\frac{1}{4}$ sec.14, T.8 S., R.35 $\frac{1}{2}$ E. Road to property in good condition. About 1 mile northeast of Buffalo-Monitor.

History: Located before 1900 by Batiste Tardiff and relocated in 1914. Deeded to Clair Tardiff. Small production.

Area: 3 unpatented lode claims.

Equipment: 2 ore cars, 700 feet of track, old forge and bellows, large air compressor, and 2 cabins.

Geology: Country rock argillite. At least two parallel veins, striking N.60° E., and dipping 85° S., are cut by 360 feet of crosscut running south. The lower crosscut continues south past veins for at least 500 feet. No ore was seen in this portion of workings in a hurried survey. Another tunnel, 300 feet south and 250 feet above runs in 100 feet to hit a 40-foot shaft which has east and west drifts at the bottom. There is a total of about 2000 feet of

workings. Vein no.1 is 2 feet in width, dips 80° S.; the second vein is similar but narrower where seen. Caved portions prevented complete survey.

Informants: E.R.Thompson, A.Perard, and R.G.Amadon; J.E.A. 6/29/38.

References: Lindgren 01:685
Swartley 14:137
Parks and Swartley 16:36
Hewett 31:15, 35.

BOULDER CREEK (Placer) Granite District Granite Area

Owners: Joe Davis and Clarence Thomas, Granite, Oregon, have taken an option to purchase the Boulder Creek placer from Jesse Elliott, Baker, Oregon, and B. G. Austin, Granite, Oregon.

Location: On Boulder Creek 2 miles north of Granite.

Area: One 160-acre claim.

Equipment: Boat with Bodison trommel 4 feet in diameter and 24 feet long and having 3/8 inch opening. Link Belt dragline with 1½ yard bucket. No.45 International dozer with 9-foot blade. 35-foot stacker with 30" belt. Truck and other incidental equipment. Power on boat is furnished by 45 h.p. and 40 h.p. diesel engines.

Geology: The average depth of bedrock is 10 feet. Most of the gravel is medium and fine. A few boulders are 10" in diameter. There is little or no clay. The yardage is estimated to be 1,750,000 yards.

Informant: Clarence Thomas, H.K.L. 12/6/40

BUFFALO-MONITOR MINE (Gold and silver) Granite District Granite Area

Owner and operator: Bruce Dennis, 403 Pacific Bldg., Portland, Oregon.
W. F. Allen Jr., Granite, Oregon, superintendent.

Location: SW¼ sec.14, T.8 S., R.35½ E.; 5 miles north of Granite.

Area: 3 unpatented claims and patented millsite (including Constitution vein).

History: The ownership of the property has undergone many changes since the early days of Oregon mining. Operations under the present management started in June 1939. The ore was sorted; high-grade was shipped directly to the smelter and lower-grade ore was milled in a 30-ton mill. On November 2, 1939, the mill burned.

After the mill burned, mining was continued. High-grade ore was sorted and shipped to the railhead during the summer. Mill ore was stored on the surface and underground until the new mill was completed on November 1, 1940. This mill, which is a 35-ton flotation plant, is now in operation.

Development: In the Buffalo-Monitor section of the mine about 4000 feet of work has been done on several levels to a point over 400 feet below the outcrop. Three veins have been developed on two main levels (200 feet difference in elevation), and are now stoped above the lower level.

A crosscut 190 feet long was driven from the old Buffalo workings in 1938 and 1939 to cut the Constitution vein. About 200 feet along this vein is being stoped at present. The north face of the drift is being continued.

General description: The Constitution is the only vein being mined at present. The camp at the old Buffalo campsite contains a mill, shop, compressor house, mess hall, several cabins, and bunkhouse. Camp elevation is about 5800 feet. Water is sufficient for camp and mill, but is not plentiful. There is abundant timber on the claims. Snowfall varies from four to six feet.

The mine employs 15 men.

Geology: The ore minerals consist of blue quartz, chalcopyrite, pyrite, calcite, stibnite, tetrahedrite, and proustite (?). The tetrahedrite is said to appear in the lower levels. Textural relations show that the calcite was in place first, then the quartz. Chalcopyrite appears in some places. Azurite and chrysocolla also occur in the upper levels. The best values are said to occur in the blue quartz with fine sulphides in ribbon structure. Values here run up to \$600 a ton or more. The ore bodies then vary considerably in width, sometimes pinching down to 1 inch or so and then widening out to a maximum of 3 feet; they are more or less continuous. All veins strike north and south, and dip steeply to the west.

Mill: The new mill, which was completed November 1, 1939, was constructed on the site of the old Buffalo mill. It has foundations, retaining walls and floors all of concrete. All floors drain to a sump. The framework of the crushing plant, as well as coarse and fine ore bins, was constructed of round native timber. The mill building proper was framed with sawn lumber and was completely covered with galvanized iron. Each piece of equipment has an individual electric motor and V-belt drive.

Mill flow sheet: Mill ore is trammed to the mill storage bin. From the storage bin it is drawn over a 1-inch grizzly. Oversize is fed to a 7"x10" Gates crusher. Undersize and crushed product pass to a 14" belt conveyor to a fine ore bin (200 ton). From the fine ore bin, ore is fed by an adjustable feeder conveyor into a 5'x4' grate discharge ball mill in closed circuit, with a type C Dorr duplex classifier. Classifier overflow passes into a 5'x6' conditioner to 6 24-inch Weinig sub A flotation cells each equipped with a 3 h.p. motor. A finished concentrate is taken from the first two cells and a rougher concentrate from the last four. Rougher concentrate is returned to the head of the flotation circuit. Flotation tails pass to two 16-foot Allen pneumatic flotation cells. Tailing goes to waste and froth goes to 2-inch Wilfley sump pump.

Finished concentrate goes to a bucket elevator and to an 11-foot Dorr thickener. Thickener overflow goes to the 2-inch Wilfley sump pump which discharges to the feed water tank where the amount of fresh water needed for the grinding circuit is added by a float valve from the water storage tank. Underflow goes to a 3'x4' Oliver thickener. Thickened concentrate is dried to 1 to 2 percent moisture on a dryer, sacked and shipped to the smelter. Mill heads vary from \$15 to \$20 per ton.

According to Hewett: (31:22)

"The three parallel veins explored in the Buffalo mine have general resemblances. There is generally a persistent footwall strand of quartz 6 to 15 inches wide, with coarse and fine sulphides, and less persistently a hanging

wall strand. The examination of a suite of polished specimens from veins 2 and 3 indicates that dolomite, possibly with some quartz, was the earliest mineral; this was crushed, and quartz was deposited, followed by coarse pyrite and arsenopyrite. After further crushing, sphalerite, then chalcopyrite, tetrahedrite, and galena were deposited. Thin sections indicate that after the early crushing some quartz fragments were secondarily enlarged; in other places long blades of quartz seem to have grown in the breccia but there has not been widespread recrystallization. Pyrite and arsenopyrite seem to have been deposited largely by replacing quartz".

Hewett (31:15) gives a milling record as follows:

"Milling and Production: Concentration ratio about 10:1; tends to decrease with depth. Bullion: gold 600 silver 350. Gold 20 percent free. Ratio of gold to silver, 1:10. Production estimated at \$350,000."

Informant: W. F. Allen, Jr., Granite, Oregon. H.K.L. 12/4/40.

References: Lindgren 01:685

Swartley 14:137

Parks and Swartley 16:46

Pardee and Hewett 14:106

Hewett 31:8,10,15,22,25,33,35,39,42 (quoted in part)

BULL RUN MINING COMPANY (placer) Granite District Granite Area

According to MINING AND CONTRACTING REVIEW of September 28, 1937:

"The Bull Run Mining Company, Sumpter, has applied for five second feet of water from Boundary Creek, tributary to Bull Run Creek, in Grant County for mining purposes."

CAP MARTIN MINE (Gold, silver) Granite District Granite Area

Owners: Mrs. E. B. Casteel, Meacham, Ore.; Mrs. W. A. Gillam, Cloverdale, Ore.; Carl Hemphill, Pilot Rock, Ore.

Lessee: Byron Brown, Stanfield, Oregon.

Location: 1 mile NE of Tillicum Mine, in the NW $\frac{1}{4}$ sec.25,T.8 S., R.35 $\frac{1}{2}$ E.W.M. Elevation 5600 feet. On Granite Creek.

Area: 5 unpatented lode claims.

Equipment: 3 cabins, mine car, track.

Development: 3 tunnels, of 80, 100, and 150 feet length; one 36-foot shaft caved.

Geology: Country rock granodiorite, cut by system of northeasterly trending veins, dipping west. Complex faulting and movement, although gouge is rather scanty. Slips mostly vertical. Ore of white and grey quartz with abundant sulfides. Some parallel banding in the ore. Thickness from one to two feet. Values up to \$45 per ton.

Miscellaneous: Transportation 4 $\frac{1}{2}$ miles to Granite. Climate moderate; 5 feet of snow; season from June to November. Water abundant from Granite Creek.

Informant: Byron Brown; J.E.A. 9/24/39.

CENTRAL MINE (Gold)

Granite District

Granite Area

Other Name: Shipman Claims

Owner: Robert Graham, St. Cloud, Minnesota.

Lessee: Ed Forcier, Granite, Oregon.

Location: $N\frac{1}{2}$ sec. 23, T. 8 S., R. 35 $\frac{1}{2}$ E.W.M. On Granite-North Fork road, 3-3/4 miles north of Granite.

Area: 5 unpatented lode claims. Located originally as "Shipman Claims".

History: Relocated in 1926 by George Graham. No production except 27 sacks hand sorted ore, which ran \$127 per ton.

Development: Three tunnels (two caved) totalling 500 feet. Tunnel no. 1 runs N. 30° E. into the hill; it is said to be 55 feet long and did not hit vein. Tunnel no. 2 lies 40 feet east of No. 1, and is said to run 350 feet northerly, intersecting the vein about 100 feet from the portal. Tunnel no. 3 lies about 125 feet east of No. 2 and runs N. 30° E. for 120 feet, and follows the vein N. 20° E. for 130 feet.

There are said to be two veins lying 90 feet apart striking N. 20° E. and dipping steeply to the west. Tunnel no. 2 (caved) is on the west vein and tunnel no. 3 is on the east vein. The Monitor vein is said to lie about 210 feet west of tunnel no. 1. The country rock is argillite. The west vein is said to have 6 inches of high grade assaying over \$100 and a total of 28 inches assaying \$26. The east vein, 6 inches of quartz, is at present in a barren zone.

Miscellaneous: Timber is abundant; climate moderate; accessible all year. Equipment, one car, track, two cabins and blacksmith shop.

Informant: Ed Forcier, J.E.A., H.K.L. 12/4/40.

CONSTITUTION MINE

Granite Area

(See Buffalo-Monitor)

CONTINENTAL MINE (Gold)

Granite Area

Owner and operator: J. A. Gyllenberg, Baker, Oregon.

Location: Located 8 miles north of Granite and 2 $\frac{1}{2}$ miles north of the Buffalo mine in the center of the $N\frac{1}{2}$ sec. 12, T. 8 S., R. 35 $\frac{1}{2}$ E.W.M.

Area: Ten unpatented claims.

History: Located in 1880 by Ike Klopp, who built an arrastre on Onion Creek and milled his development ore. Klopp drove 600 feet of tunnel on a high grade vein. Property was acquired and run by Bill Crowe for a time. In 1915 the mine was sold to the Continental Mining Company, which was managed by W. W. Robbins. This company is said to have mined high grade ore valued at over \$50,000. J. A. Gyllenberg acquired the property from W. W. Robbins in 1926.

Equipment: Four cabins, one ton mine car, 1000 feet of track, 150 cubic feet compressor, and two drifters.

Development: Some 800 feet of tunnel driven in a northerly direction near old mill. The main working tunnel is over the hill north of the mill and has a 400 foot cross cut and 350 feet of drift.

Geology: Country rock is mica schist and gneiss, cut by three veins, which strike from 45° to 75° east. The veins dip 35° to 50° to the south. They vary in width from 4 to 12 inches and are at times accompanied by a streak of gouge on the hanging side.

Work at present is being done on what is believed to be the Pioneer vein.

Underground this vein strikes N.75° E. and dips 32° to the south. The foot-wall streak of the vein is about 6 inches wide and composed of quartz and pyrite with minor amounts of arsenopyrite, sphalerite and galena. The center section of the vein is broken iron-stained quartz. There is an 18-inch streak of gouge between the vein and hanging wall.

Informant: J. A. Gyllenberg, H.K.L. 10/28/40.

COUGAR-INDEPENDENCE GROUP (Gold) Granite District Granite Area

Owners: Independence Mining Co., Appleton, Wisconsin.

Operators: Cougar-Independence Lessees. G.P.Lilley, general manager; G.T.Vandel, general superintendent; J.B.Isgrig, office manager; Ben O'Fray, mine superintendent; Bruce Stoddard, mill superintendent.

Location: Three miles north of Granite in SW²₄ sec.29, T.8 S., R.35¹₂ E. The Cougar is located on the east fork of Ten Cent Creek, the Independence over the ridge on Granite Creek to the east. It is about 4 miles north of Granite.

Area: Seven patented, fifteen unpatented, and two fractional unpatented lode claims.

Development: At the Cougar Mine development consists of 725 feet of drift and crosscut on no.1 level; 1700 feet on no.2 level; 1420 feet on no.3; 450 feet on no.4; a two-compartment shaft sunk 270 feet below no.3 level or 440 feet below the outcrop, and a shaft station cut on no.5 level. It is estimated that there are 2000 feet of raise.

At the Independence Mine, which is idle at present, the development consists of an upper tunnel 250 feet long and a lower level consisting of a 1020 foot tunnel and a 1200 foot crosscut to the vein.

Miscellaneous: Timber for the mine is hauled about six miles. Winter weather is fairly severe with a snowfall of 30 to 60 inches. Transportation is, therefore, difficult and expensive during the winter season. Seventy men are employed at the mine.

Geology: Cougar Mine: In the vicinity of the Cougar Mine the country rock is grey to black argillite, in general thin bedded. A considerable amount of carbonaceous material is noted, particularly near the hanging wall of the vein in the vicinity of the major orebody. Many dikes traverse the argillite, having a strike from north to northwest and dipping SW from 65° to 85°. The greater percentage of these are light-colored, where exposed near the vein zone, but several have been noted that have a preponderance of dark-colored minerals and a more granular structure. In the absence of definite data for classification, they are locally designated as acidic and basic. Hewett classifies the dikes of the district as aplite (light) and quartz diorite to quartz monzonite (dark). They are pre-mineral with respect to the Cougar vein, having been displaced a considerable distance by the vein fault with the resulting drag forming a part of the vein-filling.

The strike of the vein ranges between N.43° E. and N.50° E. with a dip to the SE from 70° to 83°. Strike is remarkably uniform over a given distance within the ore zone but the dip varies considerably in short distances between

the limits given above. Width is from a few inches to 2 feet outside the productive areas to from 3 feet to 9 feet within the orebodies that have been mined to date.

Mineralization occurs along a fracture that has approximately 340 feet horizontal displacement with considerably less vertical movement as determined from correlation of footwall and hanging wall dikes. For all practical purposes the dikes may be considered as striking at right angle to the vein fracture and are displaced by the vein fault. In the locality of numerous footwall and hanging wall dikes the vein contains a considerable amount of mineralized, altered dike material and is considered to be present as drag into the vein fissure during movement along the vein walls. The vein fissure is considered to be a normal fault with movement along a northeast direction and as a consequence dike material fills the vein from the hanging wall of a footwall dike to the footwall of a hanging wall dike. In other sections of the mine where no dikes on either footwall or hanging wall are in evidence with sufficient width to produce the amount of dike filling that now exists, it is concluded that a dike was intruded into the vein fracture before the vein minerals. Hewett states that "In several places it seems clear that some dikes were intruded before the vein-bearing fractures were formed; afterward other dikes were intruded on the fractures but before the quartz, gold and associated minerals were deposited."

The Cougar Vein is of the "composite type" made up of several strands. The width seems to be influenced to a great extent by the enclosing rock as shown by an appreciable increase in vein width at places where the vein fracture passes from argillite to a dike zone. The central portion of the vein often is a breccia composed of angular slate fragments cemented by quartz and dolomite with many open vugs lined with needle-like quartz crystals. The hanging wall section of the vein shows considerable black gouge and carbonaceous material while in many cases the footwall shows only a very narrow band of broken, gouge material. Gold values are largely confined to the area between foot and hanging walls although gold is shown from assay of material at a considerable distance from the vein, in minor amounts.

A limited amount of microscopic work on thin sections and briquettes has been done by John Grove ^{1/}. This work has not indicated the presence of free gold as would be expected, since none can be obtained from panning of finely ground concentrates. However, higher magnification may show the existence of free gold. The secondary or later quartz shows comb structure and has a very vuggy appearance; the original quartz is very fine grained and probably is a colloidal deposit. Grove further states that "the paragenesis of the minerals is as follows: original quartz, pyrite, later quartz, and arsenopyrite and chalcopyrite". In this work he did not note the evidence of any carbonates, but it is definitely known that in many portions of the vein the filling consists largely of dolomite which has been later broken and recemented with quartz and dolomite. Qualitative chemical analysis shows that siderite exists in certain sections of the vein where it is seen to fill many small veinlets, and appears to be of a crystalline nature with the crystals projecting inward from each wall of the small fractures. In some cases, as shown by chemical analyses, the mineral should more correctly be classed as ankerite.

^{1/} John Grove, Senior Thesis Work, University of Washington.

The ratio of sulfides to vein filling is approximately 1:10 although higher and lower ratios have been obtained from milling operation.

Equipment: Mine - One 550 cu.ft. Ingersol and horizontal type compressor powered by 100 h.p. motor; one 280 cu.ft. Gardner ^{Rand} ^{Denver} vertical type compressor; numerous jack hammers, stopers, and drifters; mine cars and track; one 30 h.p. hoist in main shaft and one $7\frac{1}{2}$ h.p. auxiliary hoist; Eimco-Findlay loader.

Mill - The mill treats 80 tons of sulfide ore which averages \$10 to \$15 and makes a \$100 to \$130 concentrate. Mill recovery averages 90 percent.

The flowsheet is as follows: Mill ore trammed from mine and dumped into 150-ton coarse ore bin. From coarse ore bin fed over $1\frac{1}{2}$ inch grizzly to 8x20 inch jaw crusher. Undersize and crushed product delivered to 70-ton fine ore bin by 18 inch belt conveyor. Fine ore bin to 6x6 foot Colorado Iron Works grate discharge ball mill. Minus 10 mesh ball mill discharge to number 250 Denver Sub-A unit flotation cell. Unit cell tailing to 4'6" type C Dorr duplex classifier in closed circuit with ball mill. Unit cell concentrate to cleaner circuit. Classifier over flow at 20 to 25 percent solids to 12 number 18 Sub-A flotation cells. Concentrates from first two cells to cleaner circuit of four 22x27 inch Denver Sub-A cells. Concentrates from cells numbers 3, 4, 5, and 6 returned to number 1 cell. Middling from cells numbers 7 to 12 inclusive returned to number 3 cells. Tailing to waste. Tailing from cleaner circuit to Dorr simplex classifier; overflow to Dorr duplex classifier and sands to ball mill for regrind. Concentrate from cleaner circuit to 8x10 foot Dorr Thickener. Clear overflow to waste. Thickener underflow to Oliver filter. Concentrate trucked to Baker and shipped via Union Pacific Railroad to United States Smelter at Salt Lake, Utah. Forty-six cars of concentrate were shipped during 1940.

Reagents used in the mill are soda ash, sodium metasilicate, pine oil, xanthate Z-6 and American cyanamid 301.

Informant: G. T. Vandel, H.K.L. 2/4/41.

"The country rock is a black siliceous and semi-slaty argillite. The strike of the lode is northeast and its dip is 60° to 70° SE. The underground workings, combined with the surface pits, trace the lode for about 2000 feet. The outcrop on a gently rolling timbered ridge is inconspicuous. The lode is from 2 to 10 feet wide, although in the lower and recent development it appears in one place to be much wider. The walls over a considerable area in the stopes are fairly well defined, although the filling is largely brecciated argillite.

"There is very much less quartz than in most of the brecciated zones in argillite in eastern Oregon. Aside from the quartz and shattered argillite there is a gouge of light color that is said to contain the highest values, which gradually lessen away from it. This would indicate that the ore was deposited by a combination of replacement and quartz filling of the smaller fractures. There are 3 or 4 shoots in the 1200 feet of development on the strike of the vein, whose combined stopping length is more than half that distance. According to reports there is a large tonnage of ore averaging nearly \$7 a ton, and a much smaller quantity in one block, which contains nearly twice that value per ton.

"A few thousand tons at various times have been stoped and treated in a crude mill upon the property, but there is practically no free gold even at

the surface. Cyaniding this ore, which is by no means easy to treat, although the sulfides are nearly all pyrite, has been attempted by incompetents or else the management so interfered with competent metallurgists that they gave up in disgust before a process could be successfully established.

"Of the gross value in the tonnage of ore treated, all but a tithe went down the creek. In the last few years work has been confined to development 100 feet below the mill level for 500 feet along the vein. (Parks and Swartley 16:81).

In discussing the Independence Mine Parks and Swartley say: "The vein is explored for about 1100 feet along the strike N.50° E., and to a depth of 190 feet below the outcrop. The vein dips 65° SE. Two shoots, 320 feet and 120 feet long, having average widths of 3 and 2.8 feet respectively, have been developed. The first of these has been stoped to a height of 60 feet above the tunnel, and is known 100 feet lower in a drift from the shaft. In the accessible workings the vein, which contains only a meagre amount of quartz, is composed of sheared argillite and gouge much stained with limonite. Unoxidized ore from the 100-foot level shows altered argillite breccia cemented by dense dolomite with minor quartz. Locally a breccia of both minerals is cemented by chalcedonic silica. Pyrite and arsenopyrite were observed both in the argillite fragments and in the cement, although tetrahedrite and pyrrargyrite appear to be confined to dolomite. Faint stains of proustite occur on fractures. The total content of sulphide minerals does not exceed a few percent. In the oxidized zone manganese stains are abundant, both on the walls and in the vein mineral.

"According to Mr. Walter Gleason, an owner, the average of a number of assays in the oxidized zone of the longer shoot is 2.66 ounces silver and .43 ounces gold per ton, and in the unoxidized ore, 100 feet lower, the average is 9.3 ounces silver and 1.06 ounces gold. These averages indicate a ratio of silver to gold in oxidized ore of 6 to 1, compared with 9 to 1 below, as well as considerable increase in the value of the ore. The associations of the rich silver minerals strongly suggest that this increase in value is to be attributed to downward enrichment, following the weathering and erosion of the superficial portion of the vein. The extent of exploration on the vein, however, does not warrant a statement of the extent to which ore has been enriched by this process.

"Several light decomposed dikes, 2 to 4 feet wide, with southeast courses, have been found in both walls. These terminate against the vein and indicate that it fills a fault fissure, although the amount of displacement has not been determined.

"The attempt made in a mill on Granite Creek to extract the gold and silver from this ore by an adaptation of the cyanide process was unsuccessful".1/

The following is taken from a table in Hewett 31:16:

"Cougar: Development- 3 tunnels, total 3000 feet; middle follows vein 1300 feet; attains 350 feet below outcrop.
Relationships:-Vein in argillite; many premineral dikes. Strikes N. 45° E., dip 78° SE. Quartz, pyrite.
Milling and Production:- Meager record. Ratio of gangue to sulphides high. Gold nearly equal to silver. Little free gold. Small production.

"Independence:- Development: 3 tunnels, total 3500 feet; lowest follows vein 950 feet below outcrop.

Relationships:- Vein in argillite (carbonaceous); many, pre-mineral dikes. Strike N.55° E., dip 66° SE. Quartz, dolomite, pyrite, arsenopyrite, pyrrargyrite, and chalcodony. "

Hewett 31:23 described the Independence ore deposit as follows:

"The Independence mine explores a single vein of composite type. The width of the vein commonly ranges from 3 to 4 feet but locally attains 5 to 6 feet between a persistent hanging wall and a less definite footwall. It generally contains a single strand of quartzose ore but locally shows four strands. Structurally each strand has a complicated make-up. The simplest parts of the vein show alternate layers of quartz containing minute arsenopyrite crystals and dolomite that surround angular fragments of argillite. Elsewhere corroded angular fragments of dolomite are enveloped and partly replaced by quartz containing minute grains of pyrite, arsenopyrite, and blende".

References: Swartley 14:135.

Pardee and Hewett 14:104.

1/ Parks and Swartley 16:81-129 (quoted)

2/ Hewett 31:7,8,9,10,16,23,32,35,39 (quoted).

GRIFFITH (Placer)

Bald Mountain District

Granite Area

Owners: W. J. and Nancy Ryder, Sumpter, Oregon.

Location: In sec.16 and 17, T.9 S., R.36 E., near the headwaters of Channel Creek.

Area: 3 unpatented placer claims.

History: Operated 40 years ago when a large yardage was hydraulicked off. At that time there was a very large boarding house and numerous cabins. The old ditch was 10 miles long from Mt. Ireland and gave a 150-foot fall with 2000 inches of water.

"The Griffith placers are in a high terrace about $3\frac{1}{2}$ miles northwest of the Weaver mine (located near the head of the north prong of Buck Gulch) at an elevation of approximately 5500 feet, and on the opposite or west slope of the Blue Mountain divide. The portion of the ridge separating the two places is from 200 to 400 feet higher.

"Lindgren has described this deposit and records that in 1900 'a hydraulic pit about one acre in extent has been made in the high gravels, and a bank 40 feet high is exposed'. The present area of this pit is about the same. Evidently little or no mining has been done since that time. Early in the past season (1909) operations at a point just west of this old pit were commenced, but after a short time they were suspended because of litigation. The gravel here lies unconformably upon fine sediments very similar to those of the Weaver mine and is thickly bedded, striking northwest and dipping 12° NE.

"In its general texture this gravel resembles that of the Weaver mine, and it is likewise affected by normal faults, one of which strikes north, with vertical dip and downthrow of 6 feet on the west.

"Considerable 'black sand' is said to collect in the sluices, and a sample of it was obtained from G. T. Pinson. Platinum was detected in this sample by D. T. Day, in greater quantity than in the sand from the Weaver mine, amounting to about $1\frac{1}{2}$ ounces per ton. In addition, this sample contained a considerable amount of gold amalgam and a few flat particles or 'colors' of rusty gold. Both this and the sand from the Weaver mine are by the partial examination made shown to be well worth saving. These occurrences of platinum are interesting as being from new localities, and the metal's close association there with serpentized rocks is in line with its general occurrence elsewhere.

"The extent of this deposit has not yet been definitely determined by prospecting. It seems, as noted by Lindgren, to extend northwestward for a mile or more, and apparently disappears under a basalt flow".

Recent development: Short ditch from the creek, 125 feet of 7-inch pipe.

Geology: Most of the bedrock is decomposed granite with some argillite to the north and east near the head of the placers. The old cuts, one of which has a 50-foot face and is over 300 feet across, are not being worked. They are composed of bedded gravels averaging less than 2 inches in diameter but containing numerous boulders from $\frac{1}{2}$ to 2 feet in diameter. All are well rounded and polished and the composition is about 30% aplite and 70% argillite with some quartzite. Above the old working a gently sloping bench at least $\frac{1}{4}$ mile square gives promise of considerable virgin territory if water could be developed. The placers downstream from this old channel are secondary gulch type. The gravels are fine and sandy for the most part and contain a large amount of black sand. Gold is fine and distributed evenly through the entire thickness of from 5 to 8 feet. 35¢ and 75¢ pieces are said to be occasionally found. A cut-off meander on the stream perhaps 300 yards long and 50 feet wide (called the Curve) gives promise of some virgin ground.

Miscellaneous: Timber is abundant and some water for a one-man operation is available from 6 to 9 months of the year.

Informant: W. J. Ryder; J.E.A. 9/27/38.

Reference: Pardee 14:187 (quoted).

INDEPENDENCE MINING CO.
(See Cougar-Independence Mine)

Granite Area

KISSELL MINE
(See Monumental)

Granite Area

LA BELLEVIEW MINE (Gold)

Granite Area

Owners: Bamberger Brothers, Salt Lake City, Utah; Western Holding Company, Salt Lake City, Utah; Mrs. C. A. Parker, Berkeley, California; A.C.Allen, Central Point, Oregon; Mrs. E. K. Eskridge, Los Angeles, California.

Operator: R. B. McGinnis, Granite, Oregon

Location: Located in T.8 S., R.46 E.W.M. The claims are recorded as lot no.41 in La Grande Land Office, U.S.Mineral Survey 258. Elevation is 7000 feet.

Area: Six patented claims, the Hope, Seminole, Mountain View, Southwest Extension La Belleview, La Belleview and Lolite. One unpatented claim and two mill sites. The claims trend northeasterly.

History: The claims were located by Cabell in 1878, who worked the ore from them with an arrastre for the free gold. In 1890 Bamberger and Keith acquired title to the property and worked it until 1892. The property was idle then until 1927, at which time Tom Kennerly took it over and built a mill. In 1928 and 1929 Mr. R. B. McGinnis operated the mine. The mine was idle from 1929 to the fall of 1939. At that time Mr. McGinnis leased the property, and in 1939 high grade ore was shipped. In early 1940 the old mill was reconditioned, and by midsummer enough ore had been proven to justify building a 3-mile power line and converting mill power from steam to electricity. Production for 1940 was \$120,000.

Geology: The country rocks are quartz biotite gneiss and granodiorite. The vein strikes from N.35° E. to N.45° E. and dips 65° to 70° NW. According to microscopic work done by R. E. Head of the U.S. Bureau of Mines at the University of Utah, the vein quartz carries marcasite, pyrite, galena, sphalerite, arsenopyrite, and traces of tellurides.

There are two ore shoots. The first is called the Lawrence shoot and is almost parallel to the dip of the vein. It is about 80 feet in length and two feet wide. It carries higher values in silver than gold and has very few sulfides. The second or main ore shoot in the vein strikes N.45° E. and dips 65° NW; it rakes 30° to the southwest. In this ore body the sulfides are coarser and the values are chiefly gold.

The intersection of these two ore shoots made a high grade stope, called the 500-dollar stope as most of the ore ran between \$500 and \$600 per ton.

Average ore in La Belleview at the present time will assay \$20. Value is divided nearly equally between gold and silver.

Development: The present workings consist of four levels totaling some 5,500 feet of drifts and crosscuts. These levels are connected by 7000 feet of raises. Air is furnished for the mine by one 350 cu.ft. Ingersoll-Rand Compressor run by a 75 h.p. motor.

Mill Flow Sheet: Ore is trammed from the mine during the day shift and dumped over a 1½ inch grizzly. Oversize goes to a No. B. 7"x14" Frazer and Chalmers gyratory crusher and thence to a 200 ton fine ore bin. From the fine ore bin, the ore is fed by two disc feeders and a belt conveyor through a 7"x14" jaw crusher to a 27"x14" Dorr simplex classifier.

The Dorr classifier is in closed circuit with a 4'x4' Colorado Iron Works ball mill. Minus ½" from the ball mill discharge is fed to two 12"x12" Pan-American jigs. Jig concentrate goes to storage. Jig tailing is returned to the classifier. Classifier overflow is fed to a series of six Denver 30" Sub A and three 30" Fagergren flotation cells. A finished concentrate is taken from the first three cells.

The concentrate is dried and shipped to the International Smelting and Refining Co., Utah.

The mill heads contain 15 to 20 percent sulfide and average about \$20. The value of the finished concentrate is from 80 to 100 dollars. Fifty tons are milled per day.

The flotation reagents used are xanthate Z-6, aerofloat 15, cresylic acid, and sodium sulfide.

"This mine is located within the area of highly metamorphosed argillite that lies along the prominent north spur from Bald Mountain, in sec.8, T.8 S., R.36 E., at an elevation of about 12 miles north from Granite and 26 miles from Sumpter, the nearest railroad station. It is owned by David Keith and J. T. Bamberger of Salt Lake City, Utah.

"The mine workings extend from the top of the ridge southward, into the ravine forming the north fork of Onion Creek. Little work has been done since 1907, and the workings on the vein are not accessible. This description is based upon an examination of the surface and notes left by the owner, F. E. Cabell, after his death, in 1912. Mrs. Cabell permitted the examination of a collection of specimens taken during the operation of the mine.

"Quartz biotite schist, in which persistent laminae of biotite separate quartzose bands one-quarter to an inch wide, forms the walls of the vein. The vein trends N.50° E. and dips northwest. Two types of ore are recognized. The commonest shows rudely alternating quartzose zones, rich and poor in sulphide minerals, with here and there a lenticular vug. In the richer zones the sulphide minerals, pyrite, arsenopyrite, blende, and galena, are coarsely crystalline and though dominantly intermixed, are locally in bands. Chalcopyrite and pyrrhotite are sparingly present. In the poorest zones the pyrite is dense and the other sulphides are only sporadically present. The second type of ore shows angular nuclei which may be recognized as mica-schist fragments, more or less replaced by quartz and pyrite, inclosed in masses of quartz crystals, radially arranged. The richer ore shows argentiferous tetrahedrite, probably in primary intergrowth with pyrite and quartz pyrrargyrite, possible proustite, and native silver occur as films along fractures.

"According to Mr. Cabell's data, 3 tunnels contain an aggregate of 6000 feet of work on the vein, over a vertical range of about 600 feet. The vein was opened for a distance of 1800 feet in addition to 600 feet explored in the Wild West claim, which adjoins the La Belleview on the southwest. Within this distance, 2 shoots were found, the larger of which attained a stope length of 280 feet. The lower portion of this shoot yielded material containing 0.40 ounce gold and 15 ounces silver to the ton.

"The total production up to 1911 including ore shipped elsewhere or milled in the mill on Onion Creek, amounted to 8000 tons, having a gross value of \$200,000. Concentrates averaged 1.20 ounces gold and 55 ounces silver to the ton, and shipping ore was worth \$60 to \$300 to the ton". 1/

Hewett 31:13,14, states: "Development-4 tunnels, 8500 feet of work; 500 feet below outcrop.

"Relationships: Vein in quartz-mica schist and gneiss. Strike N.45° E., dips 63° NW. Quartz, arsenopyrite, pyrite, blende, galena, chalcopyrite, pyrrhotite, silver sulphides.

"Milling and Production: Not available; estimated ratio of sulphides to quartz 1:5 or 1:10. Little free gold. Estimated production \$300,000.

"La Belleview mine explores several veins, but by far the greater part

of the work follows one vein. Where this vein is narrow, it consists largely of sheared chloritic gouge, but where it is 2 to 4 feet wide it is made up of two or more strands of quartz with sulphides. The quartz contains numerous phantom angular fragments of schist. A typical specimen of ore, sawed and polished, shows that early quartz and coarsely crystalline pyrite have been crushed; then arsenopyrite was deposited; this was followed by further crushing and finally by the deposition of more quartz with minor quantities of blende, chalcopyrite, and galena. Studies of the ores made by an engineer who examined the mine recently indicated that the massive pyrite and arsenopyrite rarely carried much gold but that the content was higher when galena, chalcopyrite, and antimony minerals were present." 2/

Informant: R. B. McGinnis, H.K.L. 12/13/40

References: Lindgren 01:685

Swartley 14:138

Pardee & Hewett 14:109

1/ Parks and Swartley 16:137

2/ Hewett 31:7,8,10,13,14,32,32

Lorain 38:18

MAGNOLIA MINE (Gold)

Granite District

Granite Area

Owners: W. A. Boyce Estate, San Francisco.

Location: On Lucas Gulch in the SW $\frac{1}{4}$ sec.15, T.8 S., R.35 $\frac{1}{2}$ E., $\frac{1}{2}$ mile northwest of Ajax Mine.

Development: There are 3 tunnels on the same vein, the uppermost of which was caved when the property was visited. Development consists of 465 feet in the upper and 967 feet in the lower tunnels. Only a little work has been done since 1916.

Equipment: 1000 feet of track and 2 cars. 2 large rooming houses, barn and tool shed.

Geology: The vein strikes about N.60° E. and dips 75° to the south. At one point 70 feet from the end of the lower tunnel the vein is offset 17 feet to the north by a cross-fault which occurred during or before mineralization (as the quartz vein carries around the curve). The country rock is argillite. The vein consists of spotted gray quartz and silicified argillite up to 14 inches wide but averages much less. There is a black crumbly argillite gouge and the walls are not well defined. Chalcopyrite and some other sulphides are present. There has been some stoping between the lower two levels but none was seen above the central level.

According to Mr. R. B. McGinnis, manager of the La Belleview mine, the average width of vein is 4 $\frac{1}{2}$ feet; in the lower tunnel, both north and south of the large fault, widths ran up to 6 $\frac{1}{2}$ feet.

"The vein strikes N.50° E. and dips 65° SE., cutting dark siliceous argillite, whose bedding strikes northwest, and dips steeply southwest. Within the explored portion of the vein, 960 feet, there are three stopes, 205, 155, and 25 feet long, respectively. The walls are not continuous between the first two, and as the middle shoot terminates on the southwest against a slip, it is possible that the three shoots are not on the same fissure. Near the

face of the tunnel the vein is offset 16 feet to the north along a crushed zone.

"Much of the material constituting the vein is soft, altered argillite, with a small percent of pyrite, but there are also lenses of highly silicified argillite breccia. In this material the sulphide minerals, pyrite and arsenopyrite, are confined to the argillite fragments, though marcasite occurs along secondary fractures. The maximum thickness of the longest shoot is 8 feet, but through the greater portion it averages 4 feet.

"The ore is reported to be less than \$10 per ton, and the saving in previous milling operations has been poor".

Informant: J.E.A. 6/29/38

References: Lindgren 01:684

Pardee and Hewett 14:105

Swartley 14:136

Parks and Swartley 16:148 (quoted)

Hewett 31:8, 10, 16.

MAIDEN'S DREAM GROUP (Gold)

Granite Area

Owner: J. M. Barnett, Baker, Oregon, c/o Sumpter Stage.

Location: At the head of O'Farrel Gulch sec.16, T.9 S., R.36 E., about $1\frac{1}{2}$ miles south of Ibex mine.

Area: Two and one-half patented claims known as the Maiden's Dream, Devil's Dream, and a fraction.

The property has been idle for some time. Kate Johns is said to have patented the property and built a mill about 1900. Mr. Barnett bought the property from the county for taxes in 1935.

Informant: J. M. Barnett 1/20/41.

MONITOR

Granite Area

(See Buffalo-Monitor Mine)

MONUMENTAL (Gold)

Granite District

Granite Area

Owner: J. B. Kissell, Sumpter, Oregon.

Location: This mine is located on the northwestern slope of Bald Mountain in sec.19, T.8 S., R.36 E., about 9 miles by road from Granite.

History: Mine was located in 1870 and was operated intermittently until 1928. It is one of the oldest producing quartz locations in eastern Oregon having shipped some 14 tons of ore to San Francisco in 1874. Very little work has been done upon the property in the last 20 years.

Area: 6 unpatented lode claims.

Miscellaneous: Water is ample; power can be purchased from the Eastern Oregon Light & Power Company nearby; timber on the claims.

Equipment: 10-stamp mill, capacity 50 tons per day, shop, ore cars, compressor, air pipe, and other mining tools, and a 150 h.p. motor.

Development: Developed by 600 feet of tunnels; incline shaft 200 feet; five raises, 250 feet.

According to Hewett 31:16,23, there are two tunnels and shaft, totaling about 4000 feet, and attaining 700 feet below the outcrop. There are several veins in quartz diorite. Strike N. to N.20° E., dip 65°. There has been no milling recorded. Ratio of gold to silver is 1:20 or more. Production has been estimated at \$100,000.

The workings of the Monumental mine have encountered not less than 12 veins, but most of the work has been done on 4. All of these are rather simple, single strands of quartz, for the most part from 2 to 15 inches wide. Although other sulphides were common in the upper workings, arsenopyrite is the most abundant on the lower levels, about 700 feet below the outcrop. An examination of polished and thin sections shows that an early simple quartz vein was finely crushed and recemented by pyrite, arsenopyrite, and quartz. Later, calcite veins were deposited, in part by replacing quartz.

"The outcrop has not been extensively prospected. The developments are 2 crosscut tunnels 215 and 1400 feet long respectively, attaining a maximum depth of about 600 feet below the outcrop. The longer tunnel intersects 6 well defined parallel veins on which more or less work has been done, and ore has been stoped from three, though the inner or southeastern appears to have been the more important.

"The country rock is granodiorite and the principal vein strikes N-NE. The latter consists of shattered granodiorite in various stages of alteration.

"Light-colored gouge and lenses of quartz containing pyrite, arsenopyrite, zinc blende, tetrahedrite, and galena, together with some silver minerals in the richer ore, constitute the vein. The shattering and alteration of the granodiorite may be as much as 4 or 5 feet wide, but the lenses of ore have a maximum width of only 18 inches and stope lengths of less than 100 feet.

"The production to date is reported to be approximately \$100,000. Lindgren states that the gold values increase in depth."

References: Lindgren 01:685
Swartley 14:139
Pardee and Hewett 14:108
Parks and Swartley 16:154 (quoted)
Hewett 31:10,16,23,35,36.
Lorain 38:18

NEW YORK MINE (Gold)

Granite District

Granite Area

Owners: F.J.Barker, Unity, Oregon, owns the New York claim. Charles Gunich and Nels Stevens, Granite, Oregon, own remaining five claims.

Lessees: Frank A. Hancock and Albert Anderson, Granite, Oregon, and Charles Maxwell, Bellingham, Washington.

Location: NE corner of sec.27, T.8 S., R.35 $\frac{1}{2}$ E.; just south of the old Independence mill on the east side of the creek.

History: First discovered by Johnson 40 years ago; owned by Graham until 1932. Present owners are F. J. Barker and Wisdom of New York. Leased in 1936 and 105 tons of \$27 ore were shipped. New lease with Hancock and Maxwell in summer of 1937. All development work has been done since July 12, 1937. The property is idle at the present time (1941).

Equipment: Several hundred feet of tracks and cars. The mill flow sheet is as follows: One inch grizzly; 5x7 crusher; 6x8 cyanide supply tank; 2 $\frac{1}{2}$ h.p. motor for 2'x16' Dorr classifier; 3x3, 15-ton, ball mill with 10 h.p. motor; 8'x8' Dorr agitator; 8'x16' thickeners; 2'x10' 7-cell precipitator; 8'x12' sump tank; air vacuum, and solution pumps, and a small melting furnace.

Geology: The country rock is a typical gray argillite. The ore zone runs nearly due north, dipping about 80° to 85° E.; in places the strike ranges from N.35° W. to N.4° E. The ore varies in width from 3 to 7 feet and consists of a soft red muck containing some fragments of altered argillite and frequent lenses of white argillaceous material. At the end of the lowermost tunnel fine pyrite appeared at a depth of about 150 feet.

The ore will not yield gold in a pan, being too finely divided and talc-covered; but it is amenable to the cyanide process. The mill heads have been running \$8.00 to the ton. and about 1000 tons have been milled.

Development: At the present time development consists of 5 tunnels totaling about 900 feet, all except one (100 feet) being on the same vein. This vein has been developed for a distance of 800 feet and to an average depth of 50 feet. The proven ore reserves are at least 5000 tons, and open cuts further north indicate that the vein will continue for some distance. The ore reserves may be considerably greater in the oxidized zone.

Informants: Hancock and Anderson; J.E.A. 6/30/38; H.K.L. 9/10/40.

OPHIR MINE

Bald Mountain District Granite Area

The Ophir Mine is located on Baldy Creek 1 $\frac{1}{2}$ miles east of the Monumental Mine in T.8 S., R.36 E. Information supplied by Mr. Ed. Hendrix, Baker, and Mr. McGinnis, manager of La Belleview mine, is as follows:

The property was formerly known as the Valley Queen Mine. About 30 years ago a 1400-foot crosscut tunnel, now caved, was driven, and is said to have cut a 6-foot vein. The country rock is granite. The vein occupies a fissure and from the appearance of pieces of ore on the dump, is from 6 to 8 inches in width. Both walls show plainly on specimens of the ore, which is mainly quartz, sometimes mixed with granite, carrying coarse iron pyrite. Galena and sphalerite were not seen. There is a tunnel driven on the vein, which runs nearly east and west, with a steep dip to the south.

The last work was done about 8 years ago, when leasers attempted to find shipping ore. No ore which could be mined profitably was found, and work was stopped.

Informant: H.K.L. 2/26/41.

ORO PLATA MINING COMPANY (Placer) Granite District Granite Area

Formerly operated as Western Gold Corporation of Boise, Idaho. S.K. Atkinson Sr., Box 2120, Boise, Idaho, president and manager; S.K. Atkinson Jr. superintendent.

Location: At the confluence of Granite and Clear Creeks, sections 1 and 2, T.9 S., R.35 E.W.M.

Area: 400 acres of patented land.

History: Gold was first discovered in this area, which covers old town-sites of Lawton and Milwaukee Meadows, in 1862. Benches and bars were mined. The Oro Plata Company began operating in the fall of 1938 and operated continuously until September 1940. At that time their ground was exhausted and the plant was moved to ground on the Grande Ronde River in Union County near the Indiana Mine.

Equipment: Floating washing plant of 3000 yards daily capacity. Model 95 Northwest dragline with 3-yard bucket, caterpillar, and bulldozer. About 18 men are employed.

Geology: The depth of bedrock varied from 6 to 20 feet and averaged about 10 feet. Gravel was moderately coarse, but few boulders were over a foot in diameter. Bedrock was soft.

Informant: Oregon Mining Review.

PORTER AND COMPANY (Placer) Granite District Granite Area

Operators: Partnership composed of Robert P. Porter, Mrs. R.P. Porter, A. T. Hibbard, and Mrs. A. T. Hibbard. Robert P. Porter, Baker, Oregon, is general manager. A. E. Murray, Baker, Oregon, is manager.

Location: At the present time the dredge is about one mile west of Granite. Ground lies in T.6 S., R.35 E., T.9 S., R.35 E., and T.9 S., R.35 $\frac{1}{2}$ E.W.M. in Grant County, and also on Crane Flat.

Area: Original dredgeable area was 1600 acres. Approximately 1200 acres of dredgeable ground remain on Granite Creek, Clear Creek, Olive Creek, and Crane Creek. Bull Run Creek has been dredged.

History: Dredge was set up during the summer of 1939 and started operation on September 10.

Equipment: 4 $\frac{1}{2}$ -cu.yd. bucket dredge with a normal capacity of 3800 yards a day. All electrically equipped; motors totaling 250 h.p., consisting of 1 digging motor, 1 winch motor, screen motor, stack motor, 2 small walk and rock line motors. The stacker is 75 feet long, and the main trommel 7 feet in diameter and 40 feet long. Power from Eastern Oregon Light and Power Company. Caterpillar tractor and drill rig.

Geology: The gravel averaged 8 $\frac{1}{2}$ feet in depth over the whole property. Size of gravel is usually less than 1 foot in diameter, being classified as fine and medium. Bedrock is decomposed granite. The gold is fine, lying mostly on the bedrock or within 1 or 2 feet of it. There is some clay bedrock

dikes ranging from granodiorite porphyry to quartz aplite have filled fissures in the adjoining argillite.

"The dikes in the underground workings of the Red Boy mine are very badly altered, but a microscopic examination of some of the fresher pieces shows that they are felsites of aplitic tendencies. These dikes, which near the veins are quite narrow, were injected into the fissures in a molten condition from below at some time well along in the dike-forming period. The upward flow had no crystals formed in it previous to the somewhat sudden ascension of the molten material, which because it was injected in narrow, sheetlike form between cold walls, congealed so quickly that only small or incipient crystals of quartz and feldspar had time to form.

"A further shifting and movement occurred and the planes in which the dikes were located were fractured again because they were planes of weakness. This fracturing and movement involved both dike and adjoining argillite, but the latter was fractured to a much greater degree. . . . The quartz in the veins fills in and surrounds the sheeted and brecciated argillite. In some places white quartz and dark argillite are in roughly parallel bands when the vein is observed in cross section; at other places the appearance is more that of fragments of argillite of all shapes held in a white quartz matrix.

"The characteristics of the vein itself are well stated by Lindgren: 'In their general character the veins are similar to those of Cracker Creek, though they are not so wide. They consist of a crushed fault zone in argillite, from 3 to 15 feet wide, in which the broken rock is cemented by a great number of quartz seams.

"The footwall of the Monarch is usually smooth and sharply defined, while the hanging is less well marked, a definite wall being often entirely absent. The width between walls varies from 5 to 7 feet. The vein matter is a black, crushed slate, and sometimes, also masses or bunches of soft porphyry, both containing finely divided pyrite. The vein matter is traversed by a number of small quartz seams, rarely over 4 inches wide. Most of the seams are on the footwall side and produce a banded appearance of the vein. The best pay is contained in the 2 feet on the footwall, though the whole width is mined. In a few places on the Monarch vein bunches of 5 to 6 feet of solid quartz were found. The seams usually show clearly defined comb structure, the crystals projecting from both sides of the seams, meeting in a median line. There is no evidence of surface oxidation of the Monarch on this level.

"The Red Boy vein averages from 3 to 6 feet in width and is in general structure similar to the Monarch, though the quartz is apt to form somewhat heavier bodies. It also contains more clay than the Monarch vein'.

"The value of the ore appears to be entirely contained in the quartz seams and consists chiefly in free gold alloyed with much silver, the bullion being from 515 to 525 fine. The quartz contains a small amount of sulphides, pyrite with very little chalcopyrite, and arsenopyrite Metallic silver and copper have also been found on the Monarch vein, inclosed in white massive quartz, and thus probably primary. The 5 percent sulphurets contained in the ore are low grade, from \$5 to \$20 per ton, and probably are largely contained in the slate mined with the quartz'".

"It is believed that a careful reading of the above will bring out the following facts:

"1. That the best channel was along the foot wall which lessened toward the hanging wall.

"2. That the best pay is contained in 2 feet on the foot wall, although the vein is from 5 to 7 feet wide. The values lessen, generally speaking, from foot toward hanging.

"3. That the quartz seams are banded with free crystal faces in the middle of the bands, indicating that they were formed from ascending hot solutions. Quartz formed in the cold is chalcedonic.

"4. That the value of the ore appears to be largely contained in the quartz seams, chiefly in free gold and silver.

"5. That the sulphides found disseminated in the dike and in the argillite, although taken from near the surface, are undoubtedly primary and are of low grade because of their method of deposition outside of the channel.

"A careful examination of the mine map shows that the N-S Red Boy vein dips steeply west and the Monarch vein, with a medium dip also west, joins the Red Boy vein at a horizontal angle of about 30° . The difference in dip of the two veins would cause their junction to pitch to the N-NE. The map shows this to be the case.

"The value of the ore was said to have been maintained, at least as far as the 200 level, but the development from the 200 to the Chapman level and from that level to a lower one, failed to develop ore. It is said that upon the lower level the Red Boy vein was not recognized. This would eliminate from consideration all development except approximately 300 feet on the Chapman level which, judging from its position, is on the Monarch vein.

"The excessive amount of water made mining so difficult and expensive, which, combined with the low values encountered along this distance, caused further drifting north on the Monarch vein to be abandoned. It will be noted further that crosscutting on those lower levels is practically absent. The development below the stopes is so limited and insufficient that one cannot state that the vertical limit of the stopes is the vertical limit of the ore.

"In any of the above statements it should be remembered that there probably was some mechanical concentration of gold at or near the surface due to the removal of the valueless part of the vein.

"A fault zone appears in the Red Boy mine cutting across the Red Boy and Monarch veins in the position marked on the map and labeled 'dike'. This fault zone is in a great many respects quite similar to the Red Boy and Monarch veins, but differs from them in its greater width between the hanging and foot walls. On the 200-foot level this zone must be more than 100 feet wide. This shearing was along an old line of weakness which contained one of the intrusive dikes. This dike, only a few feet wide, was involved in the shearing and faulting and blocks of this igneous rock are found in the crushed mass showing little or no shattering, doubtless due to its greater ability to resist crushing than the adjoining slate. Whether this particular fracturing occurred at the same time as that which permitted the formation

of the Red Boy and Monarch veins was not determined, but some evidences point to its having been later.

"A large amount of clay along the south wall of this broad zone of crushing is indicative of the amount of movement that occurred, which may or may not have been a compensating one."

"Red Boy hill has many dikes and veins and upon many of the latter considerable development work has been done in the past, the result of which are not available at this time. But considerable ore has been extracted from some of them. Perhaps a detailed and thorough examination of the surface and underground workings made by a thorough-going engineer might disclose evidences of additional ore bodies."

References: Lindgren 01:680
Swartley 14:189
Pardee and Hewett 14:110
Parks and Swartley 16:188-191 (quoted)
Hewett 31:9, 10, 21, 36, 42
Lorain 38:15

RUBY CREEK MINE (Gold)

Alamo District

Granite Area

Owner: Roy M. Evans, Granite, Oregon, and J.G.Ladner, Seattle, Washington.

Location: Located $\frac{1}{4}$ mile northwest of Granite-Greenhorn road on Ruby Creek in northwest corner of sec.22,T.9 S., R.35 E.W.M.

Area: 8 unpatented lode claims and a fraction.

History: Discovered in 1924 by Evans, sold to P.D. and D.M.McTavish of Vancouver who held it from 1925 to 1927. It was bought again by W.H.Star of Canyon City in 1937, and Evans has now repossessed the property. Past production is unknown. A mill was built in July 1932, and the mine had a production of \$7,430 between that time and November 1936.

Equipment: Mill equipment consists of a Foss single cylinder 20 h.p. gas engine, 8x16 Dodge type crusher, 2-inch grizzly, 5-stamp mill with Challenge feeder, and two 4x6 amalgamation plates.

Development: The eastern tunnel crosscuts 4 veins at 10-90-14- and 160 feet from the portal. The veins strike about N.10° E. and dip 80° E. Ore has been stoped to the surface in the first two veins for a distance of 30 to 75 feet and has also been stoped in the last two veins for a height of at least 74 feet. 100 feet west of the mill at a lower level another tunnel running N.65° E. was caved. It is said to be 400 feet long.

Geology: Country rock is dense cherty argillite. The ore lies between smooth walls on all 4 veins, which are about 3 or 4 feet wide and consisting of blocky, broken, iron-stained, silicified argillite. While containing many small ferruginous stringers, the vein material is very tough and hard. There are a few sulphides in the upper tunnel, but Mr. Evans says there is a greater quantity in the lower tunnel. Concentrates are not saved in the mill. It is said that between \$8 and \$10 per ton was recovered from the ore in the upper tunnel.

Informant: Roy M. Evans; J.E.A. 6/30/38; H.K.L. 6/21/40.

SHIPMAN CLAIMS

(See Central Mine)

Granite Area

STANDARD MINE

Granite District

Granite Area

Owner: John Leuck, Granite, Oregon.

Location: Middle of sec.11, T.8 S., R.35 $\frac{1}{2}$ E.W.M.

Area: 2 unpatented lode claims.

History: First discovered in the early '80's, and last worked in 1899. Leuck started reopening the workings on December 24, 1938. \$1100 is said to have been taken out of the old shaft; some of the ore was shipped, some hauled to an old arrastre.

Equipment: Tools, wheelbarrow. Winch hand made.

Development: 100 feet of crosscut and 50 feet of drift reopened in old workings. 25-foot shaft dug. Old workings said to total about 300 feet.

Geology: Country rocks granite and schist. There are two veins; one is small (up to 8 inches wide) striking NE and SW; the other larger (at least 4 feet) striking E-W. Values are said to be most at junction of veins in shaft, with up to \$25 gold and 20 ounces silver. Sulfides mostly galena and pyrite, with some arsenopyrite (?), sericite, limonite, etc. The large vein in the shaft is hard quartz at least 6 feet wide. It strikes N.65° E. and is vertical.

Miscellaneous: Distance is 9 miles to Granite; 3 miles to Granite road by forest road. Climate is fairly mild; 6-10 feet of snow in winter; season open April to December. Water is available from Crane or Little Onion Creeks. Relief is insufficient to get much depth on ore body without sinking.

"Development consists of one 400-foot tunnel. Vein in quartz-mica schist. Quartz, pyrite, and arsenopyrite. No milling recorded; about 10 percent sulfides. No production".

Informant: John Leuck; J.E.A. 9/23/39.

Reference: Hewett 31:15 (quoted).

TILlicum MINE (Gold)

Granite District

Granite Area

Owners: Vernon Pratt, Tacoma, Washington; John Prukop, Sumpter (operator); Byran Brown and Jack House, Stanfield, Oregon.

Location: Center of N $\frac{1}{2}$ sec.23, T.9 S., R.35 $\frac{1}{2}$ E.; $\frac{1}{4}$ mile up Granite Creek from the road; 3 $\frac{1}{2}$ miles north of Granite.

Area: 6 unpatented lode claims.

History: Original owner said to be W. A. Gilliam.

Equipment: 300 feet of track, 2 ore cars, air drill, pipe. Mill equipment includes a 6"x12" crusher, cone mill driven by automobile engine, 3 K&K

flotation cells, and Wilfley table driven by another car engine. 30 h.p. caterpillar tractor, and Sullivan air compressor.

Geology: All the workings are in massive biotite granodiorite. Ore lies in two main veins, both of which strike N.30° E., dip 50° SW, and lie about 40 feet to 50 feet apart. Ore consists of a crushed quartz gouge showing no sulphides and much limonite. Gold is free milling.

Development: The ore was first mined in a 200-foot tunnel running N.20° E. 50 feet above the present upper tunnel. The present veins have been developed on two levels, the lower being only 25 feet above the creek bed and the other 50 feet above. Development started on the southeastern vein. A crosscut was driven 40 feet to the northwestern vein, and a drift along it was run 135 feet. Mine is inactive at present (1940).

Informant: John Grove; J.E.A. 6/3/38; H.K.L. 10/8/40.

UNCLE SAM MINE (Gold) Bald Mountain District Granite Area

Owner: C. E. Wikstrom and Carl Wikstrom, Raymond, Washington.

Location: Located above timberline (elevation 7100 feet) on Mt. Ireland between the Ibex and Monumental Mines. The claims are in section 29, T.8 S., R.36 E.W.M.

The Uncle Sam property was operated during the summer of 1940 by C. E. and Carl Wikstrom.

Informant: C. E. Wikstrom 8/12/40. This property was not visited.

VALLEY QUEEN MINE Granite Area
(See Ophir Mine)

WESTERN GOLD CORPORATION (Placer) Granite Area
(See Oro Plata Mining Company)

GREENHORN AREA (GRANT COUNTY)

(Greenhorn, New Eldorado, and Austin Districts)

Geography:

The Greenhorn area in Baker County includes the drainage of Upper Burnt River and its tributaries northwest of China Creek, about 10 miles north of Unity. In Grant County it includes the drainage of the Middle Fork of the John Day River north of the John Day Highway (#28) and east of Big Boulder and Sunshine Creeks. To the north, it also includes all of the Clear Creek, Olive Creek, and Lightning Creek drainage south of the junctions with Clear Creek.

The mines of the Greenhorn district proper are grouped around Vinegar Hill, mostly in the north half of T.10 S., R.24, 34 and 35 E. The drainage of Big Boulder Creek is called the New Eldorado district. In Baker County ^{1/} the Geiser or Bonanza district includes the drainage of Geiser Creek, and the Whitney district includes all the area south and west of the Bonanza.

The Greenhorn range rises to an elevation of 8200 feet in Vinegar Hill and extends for 30 miles from near Whitney to a few miles west of Susanville. It is rugged only on the glaciated north side where cirques have been carved out of its rather rounded crests.

Most of the territory is heavily timbered, and only portions of the higher ridges are bare. Snowfall is very heavy. It is well watered by fairly large streams on both sides of the range.

Forest roads extend through the district and to the various properties. Whitney within the Greenhorn, and Austin and Bates within the Bonanza districts, are the only postoffices. The terminus of the Sumpter Valley Railway is now at Bates.

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 around as Greenhorn City, including those of Bonanza, Winterville and Parkerville, are practically all argillites, while the south side of the range as far around 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, which were 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

^{1/} Baker County mining properties are described in Bulletin 14-A, State Department of Geology and Mineral Industries, 1938.

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 not. Cutting across the middle portion of the range is a belt in which there is much silver in antimonial sulphides.

"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 those 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.

"In the neighborhood of Vincent Creek there are areas of greenstone in which both fissure veins and disseminated deposits of gold-bearing copper ores are found.

"The creeks which drain into Burnt River and those in the eastern end of the district which drain into Granite Creek have been extensively mined for placer gold. Those of Winterville, Parkerville, and McNamee Gulch are especially noteworthy". 1/

Pardee (41) has mapped the eastern half of the district.

History:

In 1901 Lindgren 2/ wrote as follows:

"The silver veins of the Greenhorn Mountains have been known at least twenty years, and smaller developments are noted in the Mint reports of 1890 and 1891. Lately they have been prospected more extensively.

"Rich silver ores have at intervals been shipped to the smelters in small quantities from these prospects, the Tempest being the largest producer, with 180 tons. The expenses are very high, so that ore, to be profitably shipped, must contain at least \$25 per ton. The ore must be hauled 35 miles over difficult roads to Sumpter, loaded on cars there, and reloaded on the main line at Baker City. Further, they are not very desirable smelting ores, containing no lead, but often, on the contrary, arsenic and zinc in quartzose gangue".

Pardee and Hewett (14:10) estimated the placer gold production of the district to be \$1,140,000.

In recent years the largest lode operation was at the Ben Harrison mine, while the Timms Gold Dredging Co. on the Middle Fork of the John Day River has been by far the largest placer operator.

1/ Parks and Swartley 16:270.

2/ Lindgren 01:693

AURUM GOLD MINING COMPANY
(See Rabbit Mine).

Greenhorn Area

BANNER (Gold)

Greenhorn District

Greenhorn Area

Owner: Mrs. K. W. Earhart, Whitney, Oregon.

Location: In sec.15, T.10 S., R.35 E., just east of Big Johnny Mine, 7 miles west of Tipton.

"Development: Drifted 200 feet east and 400 feet west on a vein 4 inches wide. Some ore showing. Sunk 190 feet in 1924 but no ore was shipped.

"Geology: Vein in serpentine, probably near gabbro. Strikes W., dips S. Quartz and dolomite.

"Production: No milling or production recorded".

Reference: Hewett 31:18 (quoted).

BANZETTE (Gold)

Greenhorn District

Greenhorn Area

Owner: Van E. Halberg, Baker, Oregon.

Location: "The Banzette is a little over a mile west of Greenhorn, and is in a soft decomposed serpentinitoid rock containing vein quartz, a little galena and some chalcopyrite, and some high-grade gold ore". The vein is in sheared greenstone. Strike is generally E.; dip is N.

Production: No milling or production recorded.

References: Parks and Swartley 16:25 (quoted)

Hewett 31:19

BELCHER: (Gold)(see also Golden Gate) Greenhorn District

Greenhorn Area

"Development: 2 tunnels about 3500 feet. Attain 350 feet below outcrop.

"Geology: Vein in argillite near andesite contact. Quartz and pyrite.

"Production: Small production."

According to Frank Klein the Belcher Mine is now a part of the Golden Gate mine, which is owned by John W. Douce, 4227 Burns Avenue, Los Angeles, California.

Informant: H.K.L. 10/21/40

Reference: Lindgren 01:697.

Hewett 31:20, 36 (quoted)

BEN HARRISON (Gold)

Greenhorn District

Greenhorn Area

Owners: The present owner is the Ben Harrison Mines Company of Lima, Ohio, W. T. Agerter and J. R. Carns, trustees. J. J. Heilner of the law firm of Heilner, Smith, Grant and Fuchs, Baker, Oregon, is their representative.

Development: 2 tunnels and shaft, about 4000 feet of work; attain 600 feet below outcrop.

"The Ben Harrison mine is located near the headwaters of Clear Creek close to the northwest corner of sec. 36, T.9 S., R.34 E. It is 23 miles by wagon road from Whitney and 28 miles by wagon road from Sumpter. These are stations on the Sumpter Valley, a narrow gauge railroad.

"The elevation of the working tunnel is about 6500 feet. The country rock is a medium grained slightly porphyritic "tonalitic" granodiorite. The granodiorite is cut by what are probably granodiorite porphyry dikes. About a mile northeast of the mine on the same branch ridge of the intrusion which extends out toward the Red Boy mine is an exposure of badly altered rock. The roughly parallel attitude of the hornblende crystals and the glassy nature of its feldspar suggest that this rock may have been a flow of dacite, the effusive equivalent of granodiorite. In any case it is genetically connected with the granodiorite intrusion and may have been caused either by a volcanic eruption or else a foundering of the roof of the Greenhorn intrusion, which had stopped its way so close to the then existing surface that a portion of the roof of ancient rocks broke loose and was submerged, permitting the molten rock to flow out.

"Aplite dikes abound in the granodiorite and vary in size from an inch or less up to a foot or more in width and some of them, probably the last ones formed, have such a decreased amount of feldspar that they approach quartz veins in composition, but are not mineralized.

"About one-half mile south of the Ben Harrison mine and crossing the saddle of this north and south branch of the main ridge is a body of older rocks which at the apex of the ridge is nearly one-half mile wide. This older rock is greenstone and greenstone schist. Its contact with the granodiorite on the north and south sides was not fully observed, but underground in the Ben Harrison mine inclusions of greenstone were noted in the granodiorite, proving that these greenstones are the older rocks.

"This greenstone is a very fine grained, badly kaolinized and seriticized rock containing considerable secondary quartz and chlorite. It was probably originally a basalt. The schists are fine grained, consisting chiefly of biotite and apparently secondary quartz with a few garnets. This rock is probably also of igneous origin. This greenstone schist is surrounded on all sides by granodiorite, indicating that it was a downward projecting portion of the roof of older rocks, the main body of which has since been eroded. A great many good sized veins are found exposed in this greenstone, which have been prospected from time to time, the oldest of which is the 'Potosi'.

"The Ben Harrison vein strikes N.30° E. and dips 67° E. and is lenticular in shape both along its strike and dip. Its minimum width of gouge and altered rock is about 18 inches and its maximum 21½ feet.

"The length so far stoped above the 200-foot level is about 400 feet; above the 350 and 500-foot levels the stopes are about 300 feet long. On the 600-foot level the vein has been drifted upon for 350 feet, which at the south face is 12 feet wide and the north face 6 feet wide and averaging 68 inches for the 350 opened up. This is the same average width for the length of the drift as is the 500 stope on that level. The average stoping width for the entire mine so far opened up is 77 inches, and the lowest level, the 600 has good faces of ore both north and south and will likely exceed all other levels in tonnage-feet. Its average value is between 19 and 20 percent higher than the average value of the ore in the rest of the mine, which averages a little above \$10 a ton for the 87,000 tons blocked out on at least three sides above the 500-foot level.

"The vein, a brecciated replacement, between the gouge on both walls is made up of fragments of granodiorite up to a foot or so in diameter, surrounded by vein quartz up to six inches wide. The fragments themselves are much silic-

ified and cut by minute reticulate veins. The ferro-magnesian silicate minerals are entirely decomposed and the feldspars largely kaolinized. Calcite, probably derived from the country rock, is present. The same alteration occurs in the wall rocks to a lesser degree, but this alteration of the wall rock is greatest next to the widest part of the vein.

"The outcrop of the vein is inconspicuous and is at a narrow portion of the lens, where it is only about two feet wide. At the surface it shows a typical sheared character and mineralization. Quartz, limonite, and kermesite, the red oxide of antimony, were observed there.

"Several branch and parallel veins, some of which are of considerable economic importance, from which high-grade shipping ore is often taken, have been developed during 1915 and 1916. These veins, particularly the one located the 'split vein', but in reality a continuation of the main vein, are showing up good bodies of milling ore and bid fair to multiply the tonnage available for each level.

"The ore minerals are pyrite, stibnite, a little chalcopyrite, and sphalerite. The silver sulphides are pyrargyrite and stephanite, with gold of about equal value to the silver in the ore. The gold values in the various parts of the shoot so far opened up remain reasonably constant, but the silver values are quite variable. The good silver ore is in horizontal layers, a streak of lean and a streak of fat, as it were. The silver values vary also greatly between the foot wall and hanging wall. There are many thin lenses of considerable wall area more often on the foot wall, though frequently on the hanging wall and occasionally between walls or else in branch veins into the hanging wall. Sometimes these sulphide sheets are almost pure stibnite with only a moderate silver content, while in other places they consist of quartz and disseminated stephanite, the black brittle sulphide of silver and antimony, in which there is present a small amount of pyrargyrite.

"There is also a wide variation in the silver content along the strike of the ore shoot. For instance, upon the lowest level, which is only partially developed, the average gold content north of the shaft compared with that south differs only 14 percent, while the silver content has fourteen times as much in one as in the other." 1/

"Vein strikes NE, dips SE. The width of the vein explored in the Ben Harrison mine largely ranges from 2 to 8 feet, of which one-quarter to one-half consists of several strands of quartz in the midst of sericitized quartz diorite. The vein, therefore, is much like the Monumental vein, near Granite. This section of the quartz vein material shows that an early barren quartz was crushed and arsenopyrite, pyrite, sphalerite, tetrahedrite, and stibnite were deposited in the breccia. Later a barren white quartz cemented the crushed material and sulphides." 2/

"The Ben Harrison mine, after being idle for a number of years, was recently reopened by the Campbell-Oregon Mining Co., George M. Henderson, manager.

"An ore shoot 300 to 400 feet long was mined by earlier operators to a depth of about 450 feet below the outcrop, or about 300 feet below the adit level. Some ore had been developed, but not mined, 100 feet lower on the 600-foot level. The Campbell-Oregon company is deepening the shaft and driving

levels at 100-foot intervals. When visited, preparations were being made to mine ore left by earlier operators above the adit level in addition to ore from lower levels.

"The ore shoot is a strong quartz vein between quartz diorite walls. The walls are clean-cut; the gouge seams along the vein walls are comparatively thin. A portion of the vein contains numerous inclusions of sericitized quartz diorite. The vein is from 2 to 10 feet wide. According to Swartley, a maximum width of $21\frac{1}{2}$ feet was recorded. The average width is probably 4 to 5 feet.

"The vein strikes $N.3^{\circ} E.$ and dips $80^{\circ} E.$ in the upper workings but flattens to 55° in the lower levels. Sulphide mineralization comprises pyrite, arsenopyrite, chalcopyrite, and some stibnite and tetrahedrite. It was stated that gold is found chiefly with the arsenopyrite. The ratio of gold to silver appears to vary widely from place to place. Swartley (14) stated that gold and silver occur in equal value; Hewett (31) gives the ratio of silver to gold at 50 to 1; when the mine was visited in 1936, the ratio of silver to gold was said to be averaging about 5 to 1.

"Swartley (14) stated that the average value of ore in the upper workings was a little over \$10 a ton, but that the ore developed on the 600-foot level was 19 to 20 percent higher in grade.

"The mine is completely equipped. A 700-cubic foot, 125 h.p. Sullivan WJ3 compressor supplies compressed air for mining. A 500-cubic foot compressor is in reserve. The shaft is provided with a 50 horsepower single-drum hoist of 500 pounds capacity. Other equipment includes a small sawmill, a 100-ton flotation mill, bunkhouses, and the necessary shops and miscellaneous equipment.

"A 5 x 10 foot, 2-compartment shaft is being sunk at the rate of about 3 feet per day of three shifts. Two miners per shift are employed in the bottom. The shaft and adjacent workings were making about 30 gallons of water a minute. Over-all costs are approximately \$40 a foot.

"The upper part of the shaft is vertical; as the vein flattened, the shaft was inclined to conform to the dip.

"A flat-back, open-stope mining method with stull support is used. Development raises are spaced about 200 feet apart. Where possible, flat holes are drilled with mounted jackhammer. Otherwise, self-rotated stopers are used. Detachable bits are used throughout

"Mine ore is dumped on a 2-inch grizzly; the oversize goes to a 3D Gates gyratory crusher set for $1\frac{1}{2}$ inch discharge. Grizzly undersize and crusher product go to a 150-ton ore bin.

"Crushed ore is fed by two Denver feeders to a 6 x 6 foot and a 6 x $4\frac{1}{2}$ foot ball mill in closed circuit with a Dorr duplex classifier. Three pounds of forged-steel balls are consumed per ton of ore ground.

"Classifier, overflow, at 150 mesh, goes to a 10 x 40 foot thickener, from which the pulp is discharged at about 40 percent solids by two diaphragm pumps. The pulp flows to the first of a series of 5 Kraut flotation cells. A finished concentrate is taken from the first cell. A tailing is taken from

the last cell and discharged to the tailing dump. Froth from the other four cells goes to a series of four small Kraut cells, which produce a finished concentrate and a tailing that is returned to the ball-mill circuit.

"Flotation reagents are pentasol xanthate (0.12 pound per ton) and pine oil. Xanthate is fed to the second and fourth cell of the first series of cells; pine oil to the fourth cell.

"Concentrates are thickened in a Denver thickener and filtered in an Eimco 48 inch filter. The filter cake, containing 12 to 14 percent moisture, is conveyed to concentrate bins, trucked to Baker, and shipped by railroad to the smelter. The recovery was high on unoxidized ore; the ratio of concentration was said to be about 20:1.

"In summer, concentrates are trucked 60 miles to Baker and freight returned. The cost is \$6.50 per ton for trucking, plus a \$0.55 handling charge. In winter, concentrates must be hauled 30 miles to Sumpter by tractor and sled, then trucked the remaining 30 miles to Baker. The cost of tractor haulage may be estimated at \$7 to \$8 a ton, winter truck haul \$3 to \$3.50 a ton, giving a total of \$10 to \$12 per ton for winter freighting between the mine and Baker.

"The average year-round cost for trucking freight is \$9 per ton.

"When visited, the mine had been in operation only a short time and had not reached its peak. Therefore, the following costs may not be indicative of future trend.

<u>Mining</u>		<u>Cost per Ton</u>
Drifting, per foot	\$8.00	
Raising, per foot	6.00	
Stoping, per ton	1.50	
Total Mining		\$2.35
Milling		1.50
Freight and treatment		1.50
Direct Operating		\$5.35 " 3/

The mine and mill equipment was dismantled and moved away in November 1937. The tailings from the old Ben Harrison mill have been leased by Harry H. Reed, of Pollock, Idaho, and George Doyle of Granite from Alfred Thode and George Doyle of Granite. The plant has a capacity of 50 tons, and contains regrinding, flotation and cyanidation equipment. It started operations October 15, 1940, and suspended work for the winter during December 1940.

Informant: George Doyle, H.K.L. (3/41)

References: Lindgren 01:694

Swartley 14:176

1/ Parks and Swartley 16:29

2/ Hewett 31:10

3/ Lorain 38:16

BIG ELK MINE

(See Olive Butte Mine)

Greenhorn Area

BIG JOHNNY GROUP (Gold and silver)
(See Harrison Group)

Greenhorn Area

BI METALLIC GROUP (Gold, silver, molybdenum)

Greenhorn Area

Owner: M. C. Carson, Elm Street, Baker, Oregon.

Location: In secs. 6 and 7, T.10 S., R.35 E., near the headwaters of Salmon Creek, and about $2\frac{1}{2}$ miles from the Ben Harrison mine in a straight line and about the same distance from the town of Greenhorn with which it is connected by wagon road.

History: Formerly called Intrinsic. The mine was located by S. C. Richardson who sold it in 1907. Little work was done and it reverted after one payment. One-half interest was sold to Anthony Moore in 1917, who with Richardson's partner, Andrew Larson, sold to the Eccles Company. About 2000 feet of tunnel was driven, but no drifting was done. M. C. Carson has been owner since 1920.

Geology: "The principal country rock is diorite, a peripheral differentiate of the granodiorite intrusion. Much serpentine and greenstone was observed on the opposite side of Salmon Creek. The immediate geology is complex. Large dikes which are neither a true granodiorite-porphyry nor an aplite, but a sort of intermediate which might be called a granodiorite-porphyry aplite strikes north and south on the east side of the property. They were probably walled up in fissures at a period of time midway between the time when the two types of dikes were being formed elsewhere. After this dike had become solidified, the dike and the adjoining diorite along its western side was shattered in a series of parallel breaks partaking of the nature of a shear zone. This must have been at a period considerably after the time when true aplites were formed elsewhere in the intrusion because it has been filled with almost pure quartz. The bands or ribbons of quartz are so completely cemented to the intervening dike rock that cross sections with the splendid luster of the quartz in contrast with the creamy but dull color of the dike rock makes a decidedly pleasing appearance.

"On the northeastern part of the claims, just beyond the saddle, is a light-colored rock composed almost entirely of calcite impregnated with chalcopyrite and tetrahedrite and containing some secondary feldspar and quartz. This has low values in gold and silver.

"The general direction of the veins is E-W, but these veins are the result of a more or less complex fracturing. The principal workings are in a basin about halfway up to the saddle from the creek. There has been a great deal of weathering and decomposition of the rock generally which may have been due to a centralizing of the fracturing in the basin.

"On the side hill west of the development is a large cropping at least 25 feet wide, which appears to be the result of a partial replacement of country rock with quartz, in which there are many veinlets and quartz crystals. Manganese is evident throughout, although in small percentages, and samples taken from this exposure assay about $\$1$ in gold. It could not be determined with the limited amount of development on the surface nearby whether or not this is a harder portion of the same lode seen in the principal workings to the east, which because of its more resistant nature, has not weathered as fast as the country rock or the softer part of the vein.

"The underground workings were so poorly ventilated that candles would not give sufficient light to observe very much, but it appears that there is a wide zone of softened badly decomposed rock in which there are lenses of good ore either along the walls or at places between them. How much value, if any, is contained throughout the mass is unknown, but from its appearance it is probably too low grade to mine outside of these lenses. Whether these lenses, which in places are of stopping width, have much vertical or horizontal extent was not ascertained.

"On the dump there is quite a tonnage of ore in which there is varying amounts of tetrahedrite with some pyrite and chalcopyrite. It is said that this ore has been sorted over twice and the first shipment contained between two and three hundred dollars a ton, and that the second sorting brought between one and two hundred dollars, while a third sorting, which has been begun, assays about \$75. The main ore dump will naturally average much less than the latter amount.

"The gold values are usually between one and two dollars per ton, and the amount of gold present seems to bear but little relation to the amount of silver present."

Disseminated molybdenite is present in the diorite in places. Banded cherts occur adjacent to the serpentine just above the lower tunnel portal. Small bodies of chromite occur in the serpentine half a mile west of the lower tunnel.

Development: The mine was shut down from 1914 to 1919, when 700 feet of the old upper tunnel was retimbered.

Development consists of a crosscut 2152 feet long, with drifts extending 410 feet south.

Informant: M. C. Carson; J E.A. (11/2/38)

Reference: Parks and Swartley 16:37 (quoted).

BLACK JACK GROUP (Gold) Greenhorn District Greenhorn Area

Owner: Floyd Sherwood, Box 72, John Day, Oregon. Former owner Krise Mell, Austin, Oregon.

This property consists of 3 unpatented claims known as the Black Jack and Black 1 and 2 located $\frac{1}{2}$ mile south of the Morning Mine, probably in sec. 24, T.10 S., R.34 E. There is a cabin on the property, but no other equipment.

The country rock is serpentine which is cut by narrow stringers (1 to 2 inches) of quartz and gouge. The value of the stringers is usually low, but occasionally small pockets are found which run as high as \$900 per ton.

Informant: Floyd Sherwood, H.K.L. (9/12/40).

BOWMAN MINE (Molybdenum) Greenhorn District Greenhorn Area

The Bowman Mine, the former Molybdenite Mine, was relocated by Mr. Bowman in the summer of 1940. It consists of one claim and is located about one

mile west of the Tempest Mine in sec.1, T.10 S., R.34 E.W.M.

The mine was originally located by Sim C. Richardson in 1916, who sold it to the Pacific Molybdenum Mines, Inc., of Watertown, New York.

Equipment at the property consists of 3 cabins in good condition, 3000 feet of 3-inch cast iron pipe, one 25 h.p. and one 35 h.p. gasoline engine, and a small compressor.

The country rock is a biotite quartz diorite. Molybdenite occurs in narrow veins which strike northeast. The tunnels are caved.

Informants: Sim C. Richardson and Otto Simons 10/22/40.

BRIGHT CARBONATE
(See Carbonate)

Greenhorn Area

CARBONATE (Gold)

Greenhorn District

Greenhorn Area

Owners: The present owners of the property, according to S. C. Richardson, are Mr. and Mrs. Sam Nigh, Whitney, Oregon.

Location: This property consists of 3 claims adjoining the Chloride and Tempest, in sec.3, T.10 S., R.34 E., practically on the backbone of the main Greenhorn range, at an elevation of 7250 feet. The vein is in granodiorite striking northeast, and is developed by drifts and crosscuts. Smelter shipments have been made from this property.

Geology: "The ore consists of quartz, arsenopyrite, pyrite, zinc blende, and a little galena in small veins in country rock, which has been bleached by the development of sericite and calcite stained green with chromium mica. Great widths of the veins are claimed for this property due to the parallel fracturing or shearing of the granodiorite for considerable widths, but these large dimensions are of little economic importance, since the mineralization outside of the principal fracture is nearly always insufficient to warrant mining. The values are in silver and gold. Reported assays from various points range from \$5 to \$250, more than half of which is in gold, which below the zone of oxidation may be reversed."

References: Lindgren 01:964

Swartley 14:175

Parks and Swartley 16:43,44 (quoted).

CHLORIDE MINE (Gold)
(See Carbonate)

Greenhorn Area

DAN E. STALTER
(See Stalter Mine)

Greenhorn Area

DIADEM CLAIM (Gold)

Greenhorn District

Greenhorn Area

"The Diadem is but a short distance from the Banzette and about $1\frac{1}{2}$ miles west of Greenhorn. 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".

According to Hewett 31:19, this mine was not accessible in 1930. Ore minerals are dolomite, galena, and chalcopyrite. No milling or production recorded.

References: Lindgren 01:698
Swartley 14:185

Parks and Swartley 16:86 (quoted)
Hewett 31:19, 36.

DODO CLAIM (Gold)

Greenhorn Area

Development: 2 shafts 80 and 100 feet; not accessible in 1930.

Vein in sheared serpentine. Ore minerals are quartz and chalcopyrite. No milling or production recorded.

Reference: Hewett 31:19, 36 (quoted)

DON JUAN (Gold)

Greenhorn District

Greenhorn Area

"This property is about 1 mile southeast of Greenhorn. 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."

According to Hewett 31:20, tunnel was not accessible in 1930. Ore minerals are dolomite, chalcopyrite, and pyrite. Vein in serpentine. No milling records available; small production reported.

Frank Klein believes this to be vacant ground. H.K.L. (10/20/40).

References: Lindgren 01:696
Swartley 14:187

Parks and Swartley 16:87 (quoted)
Hewett 31:20, 36.

DOUBLE EAGLE (Gold)

Greenhorn District

Greenhorn Area

"Office: The Dalles, Oregon. J.S.Fish, president; T.J.Seufert, secretary; J.C.Hostetler, treasurer, all of The Dalles, Oregon. Capital stock \$1,050,000; par value \$1.00; \$990,100 subscribed, issued and paid up. (1916 report).

"This company owns 7 quartz claims in S $\frac{1}{2}$ sec.3, T.10 S., R.35 E., about 2 miles north of Greenhorn, Oregon, on the west side of Quartz gulch. Reports of 10 years ago state that there were 500 feet of drifting upon a vein (not described) on an upper level and a 1200-foot crosscut below, which had not reached the vein.

"A vein discovered in 1916 is being prospected".

There has been no activity in recent years. H.K.L. (1/20/41).

Reference: Parks and Swartley 16:87. (quoted).

ECCENTRIC

(See Roberts Mine)

Greenhorn District

Greenhorn Area

EUREKA-DIO GRACIA GROUP

New Eldorado District

Greenhorn Area

Owner: Ira Lemmon, Austin, Oregon.

Location: In sec.22, T.10 S., R.34 E.W.M. Elevation 5000 feet.

Area: 6 unpatented lode claims.

History: Located in 1903 by Lemmon. Production about \$1000.

Equipment: Two cabins, small test mill.

Development: 1400 feet on three levels. One tunnel (caved) said to tap vein at 105 feet, ^{from portal} with 55 feet of depth below surface. At this point a 20-foot crosscut shows the vein to be this width.

A second tunnel 150 feet lower down taps vein at 156 feet, with a 100 foot depth. Some crosscutting was done.

The outcrops have been sluiced for over 75 feet, and several small open cuts expose it further.

Geology: The country rock is mostly a medium-grained dark grey to brown quartz-diorite, varying in places to a heavy aphanitic black rock with a basaltic appearance in hand specimen, but a very fine-grained granitic texture under the lens. Both contain considerable amounts of disseminated chalcopryrite.

The lower tunnel (An. 5280) is said to have originally gone in 500 feet in a northeasterly direction. Caving forced more recent work to go around to the north, a distance totalling about 300 feet. Small glassy ribbon quartz veins are found in the face.

The intermediate tunnel (An.5410) is caved; it is said to have 500 feet of work done.

The upper workings (An. 5460) show the ledge, in a large open cut, to strike N.25° E.

The wide vein in the upper workings is said to run \$1.50 to \$2.00, with the narrower vein averaging \$40, and running up to \$60. The dump at the intermediate tunnel is said to run about \$6. The ore in the lower tunnel (caved) is said to have been sampled by Robert Betts and ran \$12.

Miscellaneous: Climate fairly mild. Season open from May to December, with only 4 feet of snow; sometimes open all year. Water plentiful, 2½ mile ditch furnishing plenty for sluicing or small mill operation. Water rights claimed. Timber abundant. Transportation 5 miles to the Susanville-Austin highway. Small mill on property consists of 3 stamps (1 ton capacity), Pelton wheel, and small test Wilfley table.

Informant: Ira Lemmon, J.E.A. (9/26/39).

GOLD BUG

(See Roberts Mine)

Greenhorn Area

GOLDEN GATE MINE (Gold)

Greenhorn District

Greenhorn Area

Owner: John W. Douce, 4227-3/4 Burns Avenue, Los Angeles, Cal.(1/20/41).

"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 Golden 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.

consists of chalcopyrite, with hematite and chrysocolla as alteration products. The iron oxide is vitreous, sub-opalline, and more or less massive; the chrysocolla is in narrow seams and stringers. Patches of white to green clear talcose material, calcite, and manganese also occur.

The newly discovered Windsor vein strikes N.22° E., dips 52° NW. The ore (high grade) varies from 2 to 6 inches in width. The walls are well defined, from 4 to 6 feet apart, with values across the entire width varying from \$5 to \$10. Small kidneys of chromite and magnetite occasionally appear.

Informant: Donald Kempfer, J.E.A. (9/25/39); H.K.L. (8/15/40).

HEPPNER MINING COMPANY
(See Stalter Mine) Greenhorn Area

HIDDEN TREASURE
(See I.X.L. Mine) Greenhorn Area

INTERMOUNTAIN (Gold) Greenhorn District Greenhorn Area

"These claims are located in the southeast corner sec.6, T.10 S., R.35E. and about $\frac{1}{2}$ mile north from the Bi-metallic claim, elsewhere described, and practically on its extension with the same strike of vein. It is in diorite and greenstone. The ore consists of quartz with tetrahedrite rich in silver, and the pay streak is reported to be as much as three feet wide. This property has shipped ore from time to time. The work is usually performed by leasers. Owing to a combination of circumstances the property was not visited."

This property was relocated in 1937 by C. W. and W. C. Gardner of Baker, Oregon, who shipped 78 tons of ore to the Tacoma Smelter in September 1938. One car of ore was shipped during 1940.

Informant: J.E.A. '39; H.K.L. (2/26/41).

References: Lindgren 01:694 Parks and Swartley 16:130 (quoted)
Swartley 14:183

INTRINSIC (Gold, silver, molybdenum)
(See Bi-Metallic) Greenhorn Area

IXL (Hidden Treasure) (Gold) Greenhorn District Greenhorn Area

"Office: Baker, Oregon. Fred T. Kelly, president; N.M.Kelly, secretary. Capital stock, \$1,250,000; par value \$1.00; \$1,250,000 subscribed; \$1,090,600 issued and all paid up. (1916 report).

"This property of 11 claims is located a short distance east of Greenhorn, near the center of sec.10, T.10 S., R.35 E. There are 2 shafts upon the property and drifting upon the veins has been done in each, but little has been done here recently. Three well-defined veins are said to have been opened up in which there are promising shoots of ore. The workings were not accessible in 1914, but there was some work done upon this property in the fall of 1915".

The present owner is Fred T. Kelly, Boise, Idaho.
References: Parks and Swartley 16:119 (quoted) Hewett 31:20, 36.

KING TUT GROUP (Gold)

Greenhorn District

Greenhorn Area

Owners: W. M. Rakestraw, John Bradburn, and F. T. Hughes, of Pendleton; Pat and Hattie Glenn of Granite.

Location: E $\frac{1}{2}$ sec.36, T.9 S., R.33 E., in the NW $\frac{1}{4}$ sec.31, T.9 S., R.34 E.

Area: 6 unpatented lode claims.

History: No production except from about 1400 tons of float which netted \$647 in 1893, according to old-timers.

Development: 2 short tunnels, totaling not over 250 feet, 1 ditch and a large amount of ground sluicing totaling perhaps a thousand feet which cut through the deep soil cover to bedrock while prospecting for the vein. North-south vein 200 feet west of the old tunnels has been developed by 4 shafts, from 10 to 30 feet in depth, along a distance of 500 feet.

Geology: Bedrock is argillite cut at the old tunnel by a vein 3 to 5 feet wide, composed of sheared argillite recemented with quartz and calcite. This vein strikes N.80° E. and dips 85° S. Sulphides occur occasionally; an assay sample of the pure pyrite gave a trace of gold and no silver. 200 feet west of the old tunnel the vein appears in the sluice cut and an assay gave \$2.80 in gold. Shaft no.1 (the northernmost) shows quartz at least 1 foot in width standing vertical and trending north and south. Shaft no.2 shows a vein striking N.10° E., dipping 85° W., in which the vein pinches out 30 feet from the surface. Shaft no 3 shows ore consisting of glassy second generation quartz which has formed around fragments and crystals of an earlier first generation quartz. Assay from this vein at this point gave \$47.25 in gold and \$35.40 in silver mostly contained in black tetrahedrite. In the NE corner of shaft no.4 at 35 feet, there is a small exposure of quartz containing tetrahedrite.

Informant: W. K. Rakestraw; J.E.A. (9/30/38).

KIT CARSON (Gold, platinum)

Greenhorn District

Greenhorn Area

Owner: Van E. Halberg, Box 405, Baker, Oregon

Location: N $\frac{1}{2}$ sec.17, T.10 S., R.35 E.W.M.

Area: 3 unpatented lode claims.

Development: Old open cuts and shaft, caved. Over 500 feet of tunnel, crosscut and drift.

Equipment: Small cabin, car, tools.

History: First located in 1921 by Halberg. All present work done since that time. No production.

Geology: Country rock is serpentine. A large diorite dike was cut in the tunnel. The serpentine is broken by numerous faults which strike easterly and westerly, varying from about N.65° E. to S.65° E., and usually dipping from 50° to 75° N. The gouge along the faults carries values up to

several hundred dollars to the ton, and may be as much as two feet wide, but are not continuous for more than twenty feet or so.

Informant: Van E. Halberg; J.E.A. (9/25/39).

KREIGER (Placer) Greenhorn District Greenhorn Area

According to a newspaper item of June 10, 1938, John Kreiger has been working the old Baker Placers on Upper Vinegar Creek for the last four seasons. Five men were employed during 1938. Placering was carried on for a few months in the spring of 1940.

Informant: H.K.L.

LADY BUG GROUP New Eldorado District Greenhorn Area

Owner: W. H. Silvertooth, Austin, Oregon.

Location: Sec.15, T.10 S., R.34 E.W.M. Elevation 5930 feet. Uphill $\frac{1}{2}$ mile NW of Eureka - Dio Gracia Group.

Area: 4 unpatented lode claims.

History: Located in 1910 by Butler and Kershaw.

Development: Numerous open cuts and one 130 foot drift.

Geology: Country rock is banded grey rhyolite, cut by numerous dioritic dikes, and one serpentine dike to the west forming the top of the ridge. Vein in tunnel is composed of rhyolite-breccia with a grey quartz filling, abundant heavy pyrite in spots, some arsenopyrite, some secondary manganese oxide and hematite. Large quartz outcrops are found up the hill to the north-east. Small veinlets cut through the country rock in a number of places but show little mineralization. Sulfides are spotty and low grade.

Informant: W. H. Silvertooth; J.E.A. (9/26/39).

LITTLE GIANT MINE (Gold) Greenhorn District Greenhorn Area

Owner: Judge Norbourn Berkeley, Pendleton, Oregon.

Location: NW $\frac{1}{4}$ sec.4, T.10 S., R.35 E.; one mile up mining ditch road, near head of Spring Creek and 1.3 miles from Greenhorn. Elevation 5910 feet.

History: Located in 1898. Operated about 1899 by an English company which built a \$60,000 mill (20-stamp). It has not been operated since 1905-6. W. W. Gardner says that the lower tunnel missed the ore at a depth of 60 feet.

Equipment: None left; all buildings are down. Mill was destroyed.

Geology: Country rocks are argillite, diorite, and serpentine. In location cut ore occurs as an argillite breccia; angular fragments lie in quartz. The latter shows open cavities with botryoidal chalcedony. Malachite is the only other visible mineral. Ore on the dump next to the entrance of the lower tunnel consists of massive pyrite and gray quartz, carrying some gold but no silver.

Development: Discovery shaft reported to be 40 feet deep at an elevation of about 6240 feet is completely caved 375 feet N.75° W., and 75 feet below, a tunnel now caved has been driven 300 feet with 200 feet of drift to tap the ore beneath the shaft. 1000 feet down the hill to the northwest and just above the creek, a tunnel now filled with 2 feet of water, apparently trends S.50° E. This is at an elevation of about 5800 feet. This tunnel is 850 feet long, and mostly in argillite, although there is some andesite on the dump, indicating that a dike was cut. It is reported that 300 feet from the mouth of this tunnel a 3-foot vein was cut; and another 1 to 2 feet wide carrying pyrite and arsenopyrite was reached at 800 feet. At present this property is inactive.

Informant: J.E.A. (6/28/38); H.K.L. (3/41).

MAMMOTH GROUP

Greenhorn District

Greenhorn Area

Owners: Matt Thompson, Edward Baugh, Henry Starkey, Jerry Del Carto, and William Boettcher, all of Halfway, Oregon; and George Curtis, Pine, Ore.

Location: These claims are on the southern continuation of the Ben Harrison claims, in the NW $\frac{1}{4}$ sec.35, T.9 S., R.34 E.W.M. Elevation 6700 feet.

Area: 8 unpatented lode claims.

History: Located many years ago, and held by Edward Baugh for the last 8 years. No production.

Development: Numerous prospect holes, one 300 foot crosscut which never reached the vein. In order to cut the first vein it is said that 125 feet more would be sufficient, with 400 feet more for second vein. This would give depths of 200 and 400 feet. Owners plan to do assessment work on claims in main crosscut to cut vein.

Informant; Matt Thompson: J.E.A. (9/24/39).

MOLYBDENITE MINE (Molybdenum) (See Bowman Mine)

Greenhorn Area

MORNING MINE (Gold and silver)

Greenhorn District

Greenhorn Area

Owner: William W. Gardner, Whitney, Oregon.

Location: Located 9 miles north and slightly west of Bates and 4 miles southwest of Greenhorn in the SE $\frac{1}{4}$ sec.13, T.10 S., R.34 E.W.M., at an elevation of 6400 feet.

Area: 8 unpatented lode claims.

History: Located in 1893 at which time ore was hauled from the Morning Mine to the Psyche Mill. A mill was put in 1903, and operated intermittently until 1923. The mine was taken over by W. W. Gardner in 1937. In 1938 he built a 10-ton mill, remodeled the cabin on the property and built a blacksmith shop. During 1940, 80 tons of \$20 ore were milled and 126 tons of \$40 ore shipped to the Tacoma smelter.

Equipment: Track cars, pipe, small mill consisting of 6-inch Dodge type

jaw crusher; 3-foot Hardinge ball mill; 14-foot Overstrom concentrating table; amalgamation plates, line shafts and belts. The mill is powered by a Dodge engine.

Development: Upper tunnels are caved. The lower tunnel consists of about 500 feet of crosscut to vein, and about 700 feet of drift along the hanging and foot walls. Other drifts are caved. A vertical raise was driven to the old workings which are now inaccessible. Surface prospecting consists of numerous open cuts to the northeast.

Geology: The hanging wall is predominantly greenstone; the footwall consists of greenstone, schist and serpentine. Ore lies in a 50 to 100 foot dike of altered lava, probably andesitic in nature. The developed vein lies on or near the footwall, strikes N.50° E. and dips 50° to 60° to the northwest. Above the drift in the stope the vein dip flattens to 30 or 35 degrees. The vein varies in width from 14 to 30 inches. Shoots are lenticular; values are spotty, and vary from \$15 to \$50 to the ton. A hanging wall streak of gouge accompanies the vein, varies in width from 8 to 15 inches, and assays from \$4 to \$20. The developed ore shoot is about 200 feet long and averages 3 feet in width.

Informant: W. W. Gardner; J.E.A. (9/25/39); H.K.L.(10/23/40).

"The Morning Mine in sec.13, T.10 S., R.34 E., is on the south side of the main Greenhorn ridge a little over 2 miles south of the Morris and about 5 miles by wagon road from the town of Greenhorn. This property and its extensions are in a class by themselves in this region in that they are in a mineralized dike.

"The country rock is greenstone of igneous origin, although it is so much altered that its original character is scarcely determinable. Considerable masses of serpentine are in the immediate vicinity. The ore deposit is in an altered N-S steep dipping dike. In thin section it seen to be a confused mass of altered andesine feldspars, many of which are intergrown with quartz forming a micrographic structure.

"The alteration minerals present are sericite, secondary feldspar, and secondary quartz. This rock could be called a feldspar porphyry with aplitic tendencies. Its composition shows that it is closely related to the granodiorite. The dike rock is cut by minute, quartz veins, many of which show well-formed crystals. The pyrite, associated with the quartz, has been altered to limonite, as have also the minute grains of pyrite with which the dike rock was impregnated.

"Lenticular veins of massive pyrite, approximately parallel to the walls of the dike which in some places are several inches wide, are found on the lowest or working level of the mine and apparently near the upper limits of the sulphide zone. The dike at this point is 30 to 40 feet wide, and is reported by different persons to assay from \$2 to \$5 throughout. Near the surface a stope, several sets wide, called the 'ball room stope', was mined several years ago and undoubtedly was of good grade. Most of the enriched parts have been stoped down to the lowest or mill level.

"The leasers in 1914 were mining from various parts of the mine and treating the ore in a small Chilean mill and a home-made arrastre, the latter for regrinding purposes. Amalgamation recovered a few dollars per ton and concen-

tration on revolving canvas tables was being attempted. The massive sulphides are known to be worth from \$20 to \$30 per ton and clean concentrates approximate this value, but crude methods of milling and simple cyanidation will doubtless be unsuccessful in securing a reasonably high extraction.

"A complete engineer's examination of this property together with some well directed additional exploration, might demonstrate the presence of a considerable body of ore which although of low grade would nevertheless be profitable to work."

References: Swartley 14:183

Parks and Swartley 16:155 (quoted).

MORRIS MINE (Gold and silver) Greenhorn District Greenhorn Area

Owner: Mrs. M. M. Thornburg, Granite ($2\frac{1}{2}$ claims); A.K. Glenn, Granite, (2 claims); W. A. Gillam, Granite (1 claim). Was operated under bond and lease by H. E. Shesely, Granite, in 1939.

Location: Located $1\frac{1}{2}$ miles southeast of the Ben Harrison mine in SW $\frac{1}{4}$ sec.1, T.10 S., R.34 E., and about 1.5 miles by steep road from Granite.

Area: One patented and $7\frac{1}{2}$ unpatented claims. (Original group contained one patented and $4\frac{1}{2}$ unpatented claims).

History: (by Mr. W. A. Gillam). Discovered by Bill Morris in the 1870's. Shaft was sunk and ore valued at \$30,000 hauled to Monumental Mill. The present operation (the first since 1930 when 100 feet of tunnel was driven) started in 1937. W. A. Gillam had the property from 1930 to 1937. Other operators were Jack Gyllenberg, Thody, Miller, Geiser, and Thornburg.

Equipment: Pick-up truck, 30 caterpillar and bulldozer, 2 large trucks, Sullivan compressor, blacksmith shop equipment, airline and 2 drills, 300 feet of track and car, Purox acetylene generator and welding outfit, tents and cabins.

Miscellaneous: Elevation is high and climate is severe with heavy snowfall and slides. The new tunnel is on a steep north slope in the head of a glacial cirque and it seems that there is considerable danger of snowslides. Water from spring. Timber sufficient.

Development and Geology: The old Gillam tunnel, on the west wall of a glacial cirque, is 125 feet long. Here the vein strikes N.60° E., and dips 65° to the south. It is up to 3 feet in width, all well mineralized with small patches of solid sulphide. Country rock is argillite for the first 50 feet and granite for the last 50 feet or so. Apparently there have been two periods of quartz deposition, the first accompanying the mineralization. There is a large amount of calcite and green copper stain. A limestone band cuts through the argillite a few hundred feet to the north of this property. A new or Thornburg tunnel lies in the south wall of the cirque about a quarter of a mile southeast of the old tunnel at an elevation of 7400 feet. It extends S.52° W. for 400 feet and crosscuts two well-defined veins, striking a third minor vein at the face.

The first vein is intersected at a distance of 195 feet. This vein strikes N.20° W. and dips 70° E. It has been developed for a distance of about 60 feet mostly to the north. It lies in granodiorite and shows about

8 inches of ore in the face. In the stope 20 feet above the tunnel there is 6 inches of high-grade shipping ore with a 2-foot horse, then another 8 inch band. To the south the vein pinches out. The ore requires much sorting, but is said to run \$5 in gold and up to 354 ounces in silver. The silver is contained in tetrahedrite with accessory chalcopryite, quartz and calcite.

Vein no.2 is intersected 75 feet beyond no.1 and strikes N.19° E., dips 65° to the east. North of the crosscut this vein is in granodiorite; south of the crosscut it is in argillite. In the north face there is at least 3 feet of ore which is said to assay \$30. At this point the vein curves around and strikes N. 10° W. There are 2 to 3 inches of gray gouge material on the hanging wall. South of the crosscut the vein only shows about 1½ feet of apparently barren quartz.

The crosscut has intersected vein no.3 at 115 feet from vein no.2, which consists of 8 to 16 inches of white quartz with chalcopryite, tetrahedrite, and roscelite. At this point the backs are about 400 feet. Here the vein is usually very narrow and the hanging wall consists of an 8 to 10 inch basaltic dike. The argillite country rock is green, dense, hard, and massive.

Informant: W. A. Gillam; J.E.A. (10/1/38).

This mine was inactive during 1940 H.K.L.

References: Lindgren 01:694

Swartley 14:180

Parks and Swartley 16:156

MUSCATINE (Gold)

Greenhorn District

Greenhorn Area

This property is located ¾ of a mile north and slightly east of Greenhorn and is owned by I. Helmer, Whitney, Oregon.

"Development consists of a crosscut tunnel 1000 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 recorded."

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

NEW ELDORADO MINING CO.

Greenhorn Area

(See Heppner Mining Co.)

NEW ELDORADO MINING AND REDUCTION CO.

Greenhorn Area

(See Pioneer Mine)

OLIVE BUTTE (BIG ELK) (Gold)

Greenhorn District

Greenhorn Area

Owner: Judge Norbourne Berkeley, 685 Court Street, Pendleton.

Location: SE¼ sec.35, T.9 S., R.35 E.; ½ mile N.20° E. to Olive Butte.

History: First located 40 years ago. Small amount of ore shipped.

Equipment: 1 new ore car, track, 2 good cabins.

Geology: Elevation approximately 6000 feet. 3/4-mile from Olive Creek up a very steep road. Country rock is argillite; ore is a breccia composed of angular fragments of oxidized (limonitic) country rock lying in a matrix of dense, white quartz. Most of the argillite is more or less silicified. No sulphides were seen. Chert was noticed in the argillite on the ridge top above the mine. Here the bands strike N.60° E. and are vertical. The attitude also varies to east-west, dipping 75° N.

Development: Shaft approximately 40 feet deep and shows some quartz on the dump. Another shaft 50 feet to the southwest is 20 feet or more deep, and also shows some ore. A caved tunnel entrance lies north 50 feet to the southwest. Down the hill 200 feet to the northwest from these workings and about 150 feet below, a tunnel which is caved has been driven S.25° E.

Mineralization does not appear to be extensive. The vein has not been developed for any distance and may not be very wide. The property should be opened up for a more complete examination.

Miscellaneous: Timber is abundant; water is scarce; road to mine is extremely steep. Elevation probably means that snow would interfere with all-year operation.

Informant: J.E.A. (6/27/38).

OLIVE CREEK MINING COMPANY (Placer) Alamo District Greenhorn Area

Owners: T. M. Tobin, 9332 S.Chicago Ave., Chicago, Illinois, president; S. A. Tobin, secretary; S. M. Tobin, treasurer.

Location: Olive Creek, 6 miles southwest of Granite.

Area: 7 claims, no production.

Annual report made to the Corporation Commissioner on June 30, 1937. J.E.A.

No work has been done recently. H.K.L. 3/41.

ORNAMENT GROUP (Gold and silver) Greenhorn Area
(See Quick Action Group)

OWL (RED BIRD, VIRGINIA) MINE Greenhorn District Greenhorn Area

Owner: E. E. Petty, Whitney, Oregon.

Location: N $\frac{1}{2}$ sec.10, T.10 S., R.35 E., 2 $\frac{1}{2}$ miles northeast of Greenhorn.

History: The Red Bird Mine was located in October, 1915, and produced about \$12,000 from two veins. One lode is said to have run as high as \$150 per ton with \$20 in the tails. This property was developed by 700 feet of shafts, raises, drifts, and one crosscut. A small 3-stamp mill is on the property.

The Owl was located in 1921 and has had a total production of \$13,896 (all since 1932).

Geology: The vein strikes about N.35° W. and dips near the surface 75° S., becoming steeper with depth, being 85° at 50 feet. The ore consists of a highly sheared and altered, iron-stained granite mixed with angular quartz fragments. This zone is at least 22 feet in width, and a sample along 22 feet of crosscut assayed \$3.20. Higher values appear on the hanging wall in more massive quartz from 8 inches to 2 feet in width (5 feet at one point). Highest values are said to be in quartz in a matrix of green (mariposite?) clay, highly stained with manganese and sometimes of rose variety. Lenses of a hard calcareous nature accompany the values in quartz. Gold is said to be about 700 fine; the average ore to the mill runs \$18.00 to the ton in free gold.

Equipment: Hoist run by automobile engine; 5-stamp mill (2½ tons capacity) fed from 65-ton ore bin and powered by Fordson tractor; 4x10 foot amalgamation table and Wilfley concentrating table.

Development: A shaft in ore has been put down 50 feet and a drift run 75 feet to the NW; a raise 35 feet distant was driven to the surface and all ore stoped out between shaft and raise. A 22-foot crosscut on the 35-foot level and drifts between the shaft and raise on the 15-foot level have been driven. The surface outcrop of the vein is developed by shallow pits for several hundred feet and appears to be offset to the north. During 1940 the shaft was sunk an additional 100 feet and a 30-foot drift driven to the north. 30 tons of ore were milled.

"This property (Red Bird) owned by Abel and Petty is located near the town of Greenhorn. The shoot uncovered in 1915 is reported to be about 80 feet long, from 6 to 14 inches wide, and of high grade free gold ore, said to have averaged \$500 to \$800 gold from a few tons which have been milled". 1/

The Virginia claim is included in this group. "This property is located in sec.10, T.10 S., R.35 E., about ½ mile east of Greenhorn. It has a shaft about 200 feet deep in coarse, partly crushed gabbro (greenstone). A \$20,000 pocket was taken from this property in the 90's but the prospecting done since then has failed to find another. It is not active". 2/

Informant: E. E. Petty; J.E.A. (6/30/38); H.K.L. (10/21/40).

References: Lindgren (01:696)

1/ Parks and Swartley 16:187

2/ Parks and Swartley 16:229

PARAMOUNT QUICKSILVER MINE, INC.

Greenhorn Area

Owner: I. Helmer, Whitney, Oregon.

Operators: Paramount Quicksilver Company, Inc., Baker, Oregon: Floyd King, Nampa, Idaho, president; W.C.Fellows and Don Kempfer are in charge of operations.

According to the Oregon Mining Review, January 1941: The vein has been opened on the surface and they are driving a lower tunnel to develop the ore. Brick and material for a 10-ton retort has been hauled to the property and will be assembled ready for operation by spring.

PIONEER MINE (Gold)

New Eldorado District

Greenhorn Area

Collin Chisholm, Chas Wray, J.L.Krause and E. B. Reed Claims

(Also known as New Eldorado Mining and Reduction Co.)

"Office: Austin, Oregon. E.B.Reed, president; Edwin H. Saxe, secretary-

treasurer. Capital stock, \$100,000; par value \$1.00; \$50,000 subscribed; \$1,749.50 issued. (1916 report).

"The property of this company is located in sec.7, T.10 S., R.34 E., on the southern slope of the Greenhorn range at an elevation of about 6000 feet.

"The country rock is granodiorite cut by numerous rather coarse-grained dikes of granodiorite-porphyry. These dikes are so much closer grained than the granodiorite that they remain hard after the granodiorite alongside has become quite soft in the altered zones. This altered zone is the peculiar thing about this property. It strikes N.35° E., has a vertical dip and a width of something over 200 feet, and has been traced for several hundred feet. It is a soft mass of extremely altered granodiorite, in which the ferro-magnesian minerals have been nearly decomposed and the feldspars have been kaolinized.

"There is a large number of veins in this zone varying in width from 5 feet down to a few inches. These veins are roughly parallel to the strike of the zone. The larger veins usually consist of bluish quartz; the coloring effect is probably due to minute crystals of stibnite. One vein had a streak of stibnite about 1 inch wide, associated with small amounts of pyrite, and zinc blende. A specimen containing silver sulphide, either stephanite or pyrargyrite, was found at one point. Besides the large veins, there is a number of small veins which cut the rock in every direction. These contain some sulphides of antimony and iron.

"This property is said to contain low values throughout the altered zone, but the development work consists almost entirely in drifts along the larger veins, so that there is little chance to sample in crosscuts in the zone."

Reference: Parks and Swartley 16-161 (quoted).

PSYCHE GROUP (Gold)
(See Harrison Group)

Greenhorn Area

PYX MINE (Gold)

Greenhorn District

Greenhorn Area

Owner: Frank Stewart, 2515 Valley Street, Baker, Oregon.

Location: Between forks of McWillis Gulch in sec.2, T.10 S., R.35 E.

Area: Six unpatented claims.

Development: All workings are caved. A drift on the old Pyx claim was driven 600 feet. A drift on the new Pyx claim is 150 feet in length. A shaft 150 feet in depth is full of water.

"Development consists of several tunnels and shaft, totaling 500 feet. Vein is argillite. Vein minerals are pyrite in quartz. No milling recorded; small production".

Reference: Hewett 31:20 (quoted).

QUICK ACTION GROUP (Ornament)

Greenhorn District

Greenhorn Area

Owner: Roy Allen, Bates, Oregon, and W.M. Lemmon, 1925 Edgewater Street, Baker, Oregon.

Location: This group of claims was formerly known as the Ornament Group and is located 7 miles above the mouth of Granite Boulder Creek in the W $\frac{1}{2}$ sec.11, T.10 S., R.34 E.W.M., just south of the Tempest.

Area: Two unpatented claims known as the Deer Slayer and Quick Action. (There were 4 claims in the original Ornament group).

The property is developed by three drifts, with a total of about 700 feet of drifts now open. There are two parallel quartz veins striking NE. The country rock is argillite. Ore minerals are chalcopyrite, pyrite, tetrahedrite and minor amounts of sphalerite. The vein width is said to vary from 6 to 62 inches and average 24 inches. The ore averages about \$20. Occasional pockets run as high as \$300.

"The vein is located near a contact, where granodiorite forms the footwall and argillite and limestone the hanging wall. It is a fault contact for only a part of the vein. Quartz is the gangue and the ore minerals are arsenopyrite, pyrite, zinc blende, chalcopyrite, galena, and tetrahedrite. It contains moderate values in gold and silver. The maximum width is about 3 feet. The property is developed by 3 long drifts upon the vein. Small shipments have been made from the property, but the values per ton are too low to ship the crude ore."

Informant: W. M. Lemmon (10/20/40).

Reference: Parks and Swartley 16:176 (quoted).

RABBIT (Gold) (Aurum Gold Mining Company) Greenhorn District Greenhorn Area

Owners: L.A.Woodward, Baker, Oregon; William Hay and Bennett James, Whitney, Oregon.

Location: Two miles northeast of Greenhorn in the NE $\frac{1}{2}$ sec.10, T.10 S., R.35 E.

Area: Six unpatented lode claims.

History: Discovered in 1925. Said to have produced \$40,000.

Equipment: Gardner-Denver air compressor, station pumps operated by air, new shaft building and blacksmith shop, 5-stamp mill powered by Foos gas engine, Fairbanks-Morse gas engine on primary crusher, amalgamation plates.

Development: Lineal footage of tunnels total about 1000 feet, and a 5'x9' double compartment shaft is 160 feet deep. At the 40-foot level there is a 190-foot drift to the north. At the 70-foot level there is a 100-foot drift to the south. At the 120-foot level there is a 260-foot drift to the south and a 90-foot drift to the north. At the 160-foot level there is a 50-foot drift to the north. Some stoping from the 40 and 70-foot levels, none lower.

Geology: The vein, which is said to strike N. 10° E. and dip 70° E., lies between a hanging wall of diorite and footwall of granite; it is 2 feet wide and is said to assay \$23. The gold is about 90 percent free milling with a fineness varying between 750 and 760. A surface tunnel which is said to have paid for itself from ore removed runs 500 feet south from the shaft along the vein.

Informant: Bennett James; J.E.A. (6/30/38); H.K.L. (10/22/40).

RED BIRD (Gold) Greenhorn Area
(See Owl Mine)

RICHARDSON CLAIMS Greenhorn District Greenhorn Area

Owner: S. C. Richardson, Greenhorn, Oregon.

Location: N $\frac{1}{2}$ sec.13, T.10 S., R.35 E.

"The southern extension of the above dike (see Morning Mine) was not seen, but northward what appears to be a continuation of the same dike or at least a similar one is on the Richardson group of claims with greenstone as the country rock. The light-colored altered porphyry dike is similar to that at the Morning mine. The dike here is five or six feet wide, but has associated with it a two-foot quartz vein. The values are said to be about the same as the average at the Morning mine".

Reference: Swartley 14:184 (quoted)

ROBERTS MINE Greenhorn District Greenhorn Area

Owner: Frank Roberts, Yamhill, Oregon.

Location: Located two miles southwest of Greenhorn in sec.21, T.10 S., R.35 E.

Area: Four unpatented claims known as the Eccentric, Domino, Gold Bug, and Wild Rose.

History: Located in 1899. First quartz vein developed in 1911. Mine operated from 1912 to 1917, then lay idle until 1925 and has been operated only intermittently since. At present Mr. Roberts is constructing a small mill, reopening old workings and preparing for operation in 1941. There are two cabins on the property and a third is being constructed.

Development: There are four tunnels. No.1 tunnel is caved. No.2 tunnel was driven 150 feet into an altered zone of gabbro and serpentine, which strikes N.70° W. and dips 40° NE. It is said to be over 40 feet wide and contains occasional quartz breccia kidneys, which are high grade ore. No.3 tunnel is 30 feet long and No.4 tunnel (caved) is said to be 100 feet long. Open pit work has been done above No.2 tunnel by hydraulicking in a soft zone. A total of \$10,000 has been produced which was milled from small lenses washed out of the soft sheared material.

"The vein strikes about N.70° W. and dips nearly vertical. The actual width of the vein was not determined, but the silicified replacement of the brecciated vein is of moderate width. Some of the material shows high gold values in the pan. Development work consists of open cuts, a crosscut and drift which has not gone far enough to get underneath the croppings exposed in the open cuts." 1/

"Open cut and two tunnels. Vein on contact of serpentine and gabbro. Ore minerals are dolomite, galena, chalcopryrite. Milling record not available. Production not recorded". 2/

This property has not been active in recent years. H.K.L.
Informant: Frank Roberts; J.E.A.(6/11/39); H.K.L. (10/21/40).
References: 1/ Parks and Swartley 16:194 (quoted); 2/ Hewett 31:19,36 (quoted).

ROYAL WHITE (Gold)

Greenhorn District

Greenhorn Area

Owner: Alice Wiegand, Baker, Oregon.

Location: About 1 mile north of Greenhorn, 2000 feet northeast of the Belcher tunnel, on the north end of the ridge overlooking Quartz Gulch.

"It is of particular interest, because intricate faulting is shown and the abundance of manganese oxides suggests that superficial enrichment has taken place.

"The principal development is a tunnel, which attains a maximum depth of 95 feet below the outcrop. The country rock is dense gray, thin-bedded chert, intricately fractured and locally plicated. The bedding trends east and the dominant dip is north, a structure which appears to antedate the fracture followed by the vein.

"The vein fills a well defined fracture, which strikes N. 40° E. and dips steeply west, and is composed of chert breccia cemented by dense cream-colored chalcedony, which in vugs is covered with a film of minute quartz crystals. No sulphide minerals have been noted in the vein, though iron and manganese oxides are common throughout the explorations. Two portions of the vein, which range in width from 1 to 3 feet, have been worked; a northern 160 feet long, and a southern 30 feet long. The northern end of the longer shoot abuts against a crushed zone 5 feet wide and from this a 2-ton boulder is reported to have yielded \$400 in gold. On the southern end of this shoot, the hanging wall bends over and merges with a fracture trending northwest in such a manner as to indicate that it has been dragged during a post-mineral fault movement. This portion has been explored to the surface, and has yielded several hundred tons of sorted ore containing \$25 to \$28 a ton in gold. It is estimated that 1400 tons of material remaining in the stopes contain \$7 to \$9 a ton in gold.

"The second shoot abuts on the south against an E-W fault and has also been stoped to the surface. Its northern limit has not been explored.

"Manganese oxide forms films on fractures throughout the workings, but locally occurs as lenses parallel to the bedding of the chert. In the first crosscut east, and near its intersection with the main drift, there are three lenses parallel to the bedding of the chert, which attain a maximum thickness of 10 inches. Though these may have been lenses of argillite containing more manganese than elsewhere, the relations indicate that much of the manganese in them is secondary. The character of unoxidized ore is not known, but it is possible that a portion of the gold in the vein is secondary and of superficial origin.

"A small production has been reported over the period 1904 to 1910."

The mine has been leased by Earl Reeves and W.W. Gardner, who milled some ore prior to 1938.

References: Swartley 14:187
Hewett 31:20,36

Pardee and Hewett 14:115
Parks and Swartley 15:195 (quoted).

RUBY (Silver and gold)

Greenhorn District

Greenhorn Area

"This property is located in sec.2, T.10 S., R.34 E., practically on the

backbone of the main Greenhorn range, at an elevation of 7250 feet. The vein is in granodiorite striking northeast and is developed to some degree by drifts and crosscuts. Shipments have been made from this property.

"The ore consists of quartz, arsenopyrite, pyrite, zinc blende, and a little galena in small veins in country rock, which has been bleached by the development of sericite and calcite stained green with chromium mica. Great widths of the veins are claimed for this property, due to the parallel fracturing or shearing of the granodiorite for considerable widths, but these large dimensions are of little economic importance, since the mineralization outside of the principal fracture is nearly always insufficient to warrant mining.

"The values are in silver and gold. Reported assays from various points range from \$5 to \$250, more than half of which is in gold, which below the zone of oxidation may be reversed".

References: Lindgren 01:695
Swartley 14:175
Parks and Swartley 16:197 (quoted).

STALTER, DAN.E., MINE New Eldorado District Greenhorn Area

Owners: Corporation of the Dan Stalter Heirs.

Location: SE¹₄ sec.8, T.10 S., R.34, E.W.M.

History: Leased in 1937 and 1938 to James W. and Irving Crew.

According to the Mining Journal the Stalter mines were leased in August, 1938, to the New Eldorado Mining Company, organized by J. E. Bunker, William, Honrath, and R. J. Bunker, all of Bates, Oregon.

Equipment: Press releases in the Mining Journal dated August 15, 1938, and September 30, 1938, state:

"Except for sporadic attempts at development, the mine has been idle for over 30 years. Old workings are some 3900 feet in length. A new sawmill has been installed and camp building constructed. It is planned to install a new Denver mineral jig. The 20-ton flotation and gravity concentration plant is treating 10 tons of ore daily, recovering gold, silver, and copper. It is expected to be used as a pilot plant and plans call for the installation of a 50-ton unit next spring. Milling is under the direction of James Crew. A new road is to be constructed to the mine and a four-mile flume will eventually replace the ditch through which the water is brought to operate the Pelton water wheel which supplies the power at the camp".

In 1937-8 a Ball mill with Denver sub A 2-cell flotation machine and Diesel table was run by water power from 1 mile ditch from Beaver Creek. Track, cars, buildings, 2000' sawmill, bunkhouses.

About 200 tons of ore was milled, with a ratio of about 30-1 for the concentrates, which assayed \$32.00 per ton. Recovery was said to be high, and the ore only ran about \$1.00 per ton for the vein as a whole.

Geology: "The country rock is a medium-grained granodiorite, cut by granodiorite-porphry dikes. Considerable surface weathering of the granodiorite has taken place. The remarkable thing here is the fact that one

crosses in a distance of a little over 1000 feet a dozen or more veins or lodes consisting largely of quartz, and varying in width from about a foot to 20 feet or more. These veins strike N.40° E. and dip 50° E. to 75° E. They are fairly strong fissures, some having been traced for several hundred feet along the strike. These veins are made up of solid quartz, replaced rock, gouge, and in one of the veins considerable pyrite was noted. Gold is free, at least near the surface. Most of the work has been done on the upper and smaller veins, where the ore in places is said to be rich enough to pay to treat in their 2-stamp mill, to which the ore is hauled from the tunnel portals. It is claimed that on the lowest vein a sample across more than 20 feet assayed \$16.20. Two hundred fifty-six feet of tunnel was run in 1915".

Informant: Larry Crew; J.E.A. (mine not visited) 10/8/39.

This property was idle during 1940. H.K.L. 1/26/41.

References: Swartley 14:174

Parks and Swartley 16:119 (quoted).

STERLING MINE (Gold)

Greenhorn District

Greenhorn Area

Owners: G. T. Lewis, H. N. Stevens, Portland, Oregon.

Area: Four claims.

Location: Located in Grant County about 2 miles in an airline east of the Ben Harrison mine, 2 miles north of the Bi-Metallic Mine, and about 15 miles by road from Granite.

Development: There is a fair mountain road to the mine. A 70-foot shaft has been sunk on the vein and a 400-foot tunnel taps the vein from below.

Geology: The vein is at least 8 feet wide. On the hanging wall there is a 2-foot section of fairly high-grade ore consisting of white quartz containing sulphides. The remaining 6 feet is oxidized quartz. The 70-foot shaft is still in the oxidized zone, and Mr. Lewis expects more sulfides and richer ore with depth. The strike of the vein is nearly north and south. Elevation is 7000 feet. The tunnel is in good shape and is equipped with track and one ore car. The shaft is in fair shape, but several timbers in the collar set should be replaced. Float of the same character as the ore may be traced for 2000 feet up the mountain indicating that the vein continues at least that far.

Informant: G. T. Lewis. This mine was not visited. H.K.L.

TEMPEST MINE (Gold and silver)

Greenhorn District

Greenhorn Area

Owner: Otto Simons, 1336 Third Street, Baker, Oregon

Location: Located at the head of Granite Boulder Creek three miles northwest of the Morning Mine in sec.2, T.10 S., R.34 E. Adjacent to Chloride and Carbonate Mines.

Area: Four unpatented claims known as the Tempest 1, 2, 3, and 4.

History: Prior to 1916 the property was owned by the Bennet estate,

which sold the mine to M. T. Rolland of Nampa in 1918 for \$50,000. Only \$5,000 was paid and the property reverted to Bennet. Later examined by Lowe and Davenport. Cornucopia Mines took an option in 1924 which was not exercised. Allowed to become open ground and was relocated by John Linville in 1938. Property deeded to Otto Simons by John Linville. The property is inactive.

"This Tempest property consists of 3 claims located in about sec.2 T.10 S. R.34 E., on the west side of and close to Granite Boulder Creek at an elevation of 6500 feet. The development here consists of several short tunnels from which quite a little ore has been shipped. There is said to be five veins cropping in granodiorite which strike N.35° E. and dip nearly vertical, but only one was examined. This one is up to 4 feet in width and consists of altered sericite kaolinized rock in which there are small stringers of quartz with arsenopyrite, pyrite, and zinc blende, a little gold, but with the chief values in silver.

"Very little work has been done on this property in the last few years, but the press of October, 1916, announces that this property, owned by Millard Bennett and E. E. Bennett, had been sold to Florence N. Doty, of Denver, for a price of \$50,000."

Informant: Otto Simons (11/12/40)

References: Lindgren 01:695

Swartley 14:175

Parks and Swartley 16:221 (quoted)

TIGER MINE

Greenhorn District

Greenhorn Area

Owner: Sim C. Richardson, Austin, Oregon.

Location: This property is located 5 miles northwest of the Morning Mine and $1\frac{1}{2}$ miles west of the Bi-Metallic Mine in sec.4, T.10 S., R.34 E.

Area: Six unpatented claims known as the Tiger, Leopard, Elk, Oro Fino, Oro Grande, and Spring.

Geology: None of the workings were open for inspection. The ore, which was on the dump, consists of quartz, arsenopyrite, and pyrite. The vein strikes in a northerly direction, is almost vertical, and lies between granodiorite walls.

Informant: H.K.L. 1940.

TIMMS GOLD DREDGING COMPANY

Greenhorn Area

Owners: The Timms Gold Dredging Co. is an Oregon corporation organized in 1932. Address is PO Box 2127, Boise, Idaho. The officers are Charles H. Timms, president and general manager, Bates, Oregon; H. B. Murphy, vice-president; George Murphy, secretary-treasurer; C. A. Timms, assistant manager; H. B. Timms, dredgemaster.

Location: At the present time (1940) the dredge is located on the De Witt ranch on the Middle Fork of the John Day River ten miles northwest of Bates.

Area: The dredge is at present operating on a tract of 200 acres of the DeWitt ranch, acquired about three years ago. Twenty or more acres east of the DeWitt ranch were added to this tract in February 1941.

History: The Timms Gold Dredge started operation in the fall of 1933 on their ground near Galena, below the mouth of Elk Creek, operating continuously until the spring of 1939. The dredge was then moved to its present location on the DeWitt ranch. The boat began operation on its present site in November 1939.

The company also owns and has under contract approximately 1200 acres of land on the North Fork of Burnt River, near Whitney, Baker County, on which they expect to place a dredge some time during 1941.

Equipment: Electrically equipped. 4 cu.ft. bucket dredge with normal capacity of 2,500 yards per day. Power is furnished by a 280 h.p. Fairbanks-Morse diesel-electric generating plant. Power costs are about $2\frac{1}{2}$ cents per k.w.h. An average of 20 men is employed.

Geology: The gravel at the present location averages about 9 feet in depth, and is classed as medium to fine, the maximum size being less than 1 foot in diameter. Very little clay is present. The sedimentary bedrock is tight and rather soft, which makes it ideal for dredging.

Informant: Charles H. Timms, H K.L. (2/7/41).

VINCENT CREEK GOLD AND COPPER COMPANY (Copper and gold) Greenhorn Area

Office: Austin, Oregon. Burton Miller, president; Elmer Stewart, secretary-treasurer. Report filed with Corporation Commissioner June 30, 1937.

"This property consisting of 6 claims is located on Vincent Creek 5 miles northwest of Austin. The country rock is greenstone and the ore is chalcopryrite and its oxidation products. The property was not visited, but judging by the description given it is similar in ore occurrence to that of the Listen Lake mine elsewhere described".

Reference: Parks and Swartley 16:228 (quoted).

VINCENT CREEK PLACERS (Placer) Greenhorn Area

There are a number of placer workings along Vincent Creek in the SW $\frac{1}{4}$ sec. 31, T.10 S., R.35 E., the gulch having been worked for a distance of about $\frac{7}{10}$ of a mile. These gravels were worked many years ago; quite recently there has been a resumption of activity. There is no record of production.

Typically a gulch placer, widths are rarely over 75 feet. The gravel averages 8 feet in depth and varies from 5 to 15 feet. Boulders are numerous but usually less than 1 foot in diameter. Bedrock is greenstone and banded chert. Gold is said to run as high as \$.75 a yard.

The usual way of working the ground is by hand. The only equipment used at present is a hoist for large boulders and sometimes a small light pipe and giant, together with sluice boxes.

Water is sufficient for 3 months in the spring and for 1 month in the fall. Timber is abundant.

As far as could be seen most of the creek has been tested or placered at some time or other. There may be a few unworked spots left. The wider, flat ground from $\frac{1}{4}$ to $\frac{3}{4}$ miles up from the mouth of Vincent Creek has been tested by large bulldozer pits.

Informant: J.E.A. (10/17/38).

VIRGINIA CLAIM (Gold)
(See Owl Mine)

Greenhorn Area

WEST SIDE MINE (Gold)

Greenhorn District

Greenhorn Area

Owners: Four patented claims, according to S. C. Richardson, are said to be owned by Mr. Baird of Yamhill, Oregon.

Location: Adjoins Greenhorn City on the west, in the SE $\frac{1}{4}$ sec.9, T.10 S., R.35 E.

"In this vicinity most of the geology is difficult to make out, since the rocks are so badly altered and weathered and because so much folding and faulting has taken place. They are made up of a complex of greenstones, argillites, serpentines, and near the West Side vein and in a few other places there are beds of dolomite. A "dolomite" bed is cut by the West Side vein.

"This steep-dipping N-S vein is in the form of narrow broken lenses and consists chiefly of quartz, with some dolomite and calcite. The ore minerals are galena, pyrite, gold and silver. Some time after the vein had been formed shearing took place involving a width of possibly 20 feet or more. The shearing and movement was approximately parallel to and inclusive of this lenticular vein. Since the shearing was quite pronounced with a considerable movement, perhaps involving oscillations, it has obscured and mixed the blocks of ore with the wall rocks in the shattered zone so that it is somewhat difficult to follow the ore.

"Since the shearing of the vein, about the only mineralization which has taken place is a deposition of chalcedonic quartz. A few carloads of ore were shipped from this mine in 1914 from which the returns were between \$50 and \$75 a ton. The West Side is developed by shafts about 40 feet deep, and a tunnel upon the general strike of the vein 300 to 400 feet long".

Reference: Hewett 31:19

Parks and Swartley 16:235 (quoted).

WINDSOR

(See Harrison Group)

Greenhorn Area

(North Fork, Trail Creek and Desolation Creek Districts)

Miscellaneous: Timber abundant. Water plentiful in river and in gulches from April to June. Also small amount in fall. Snowfall moderate.

Development: Bed of river was all placered at one time and the high bar on the south bank opened up with about 200 yards worked in 1937. \$69.70 said to be taken from it. There are 2 levels of old ditches on the south side of the river, about 50 and 70 feet above low water. The old workings on the bar 20 feet above low water show a 20-foot face and are about 300 feet long. These lie just below the high bar.

Geology: River workings: Bedrock argillite. Gravels up to 3 feet in diameter, averaging less than 5 inches, all well-rounded boulders, pebbles, some sand, and clay layers. The riffle boxes were started 8 feet below river level and the river by-passed. Riffles are steel and pole, with a no. 2 giant, 2½" nozzle, and 100 feet of old 7-inch pipe. There is said to be 25 colors per pan in the river bar being worked. The river gravel is from 50 to 200 feet in width averaging 75 feet, its total depth from 8 to 12 feet, but there is no evidence of testing. The grade is flat so that it is hard to get slope for the boxes.

High bar: 80 feet above river on the south side. This bar was opened in 1937 by a cut 40 feet square with a 10-foot backface. Bedrock is hackly, jointed argillite only occasionally water-worn and very hard to clean. Gravel is sub-angular to sub-rounded up to 2 feet in diameter and makes up about 60% of the face, the rest being very fine gravel and sandy soil. Gold is said to stick to the boulders, is very bright yellow, and quite fine. There is a large amount of black sand (about 2 teaspoonsful to a pan) which assays \$10.45 per ton. The bar extends for 800 feet in length and has a maximum width of 300 feet. The working width is probably less than 200 feet. It was prospected many years ago by five pits. No recent work has been done. Depth, therefore, is unknown.

Informant: T. V. Arnreiter; J.E.A. (9/11/38).

BLUE BUCKET MINING COMPANY (Gold)-Desolation Creek District-North Fork Area

Officers: Leon Starmount, 526 Hutton Building, Spokane, Washington, president; Martha L. Russell, vice-president; Wellman A. Clerk, secretary; Vera M. Wickland, treasurer. Incorporated in Washington August 14, 1936.

Location: About 16 miles southeast of Dale on Desolation Creek just below the mouth of Welsh Creek, in secs. 7, 8, and 18, T.8 S., R.33 E.

Area: 17 unpatented lode claims on both sides of Desolation Creek.

In September, 1938, according to press report in the Mining Journal: Blue Bucket Mining Company, 526 Hutton Building, Spokane, has sold its property to Submarine Gold Dredging Company, with offices at the same address, under a \$35,000 option. The arrangement was made to provide funds for exploration and development, as Submarine stock is assessable, while Blue Bucket is not. When the transfer was made the same foreman, John Moore, remained in charge.

According to the November 30, 1940, issue of the Mining Journal: Renewed development efforts are being made by the Blue Bucket Mining Company, R. H. Russell, West 827 25th Avenue, Spokane, Washington, president, to locate ore in the Blue Bucket Mine on Desolation Creek in Grant County near Ukiah, Oregon. Max Dunn of Hope, Idaho, is consulting and managing engineer and Franz Heartburg, Dale, Oregon, superintendent. Funds are said to be provided by a private syndicate of stockholders in North Dakota.

This property was not visited. (H.K.L.)

CAMP CREEK CLAIMS (Quartz and placer) North Fork District -North Fork Area

Owners: C. J. Colcord and Albert Henderson, Dale, Oregon.

Location: $\frac{1}{2}$ mile east of the mouth of Camp Creek on the north side of the North Fork of John Day River, below the forest trail in the center of sec.6, T.7 S., R.33 E.

Area: 10 claims held by location; 8 claims in a group, 2 detached farther east.

Development and Geology: All workings are less than 75 feet above the river. The walls of the canyon are very steep at this point.

Upper Pit on trail level: This pit is dug on a highly limonitic, talcose, sheared seam, striking easterly-westerly in broken argillite and dipping about 60° northerly. The ore is composed of shattered argillite, more or less cemented with hematite forming crusts and veinlets. Some chloritic material is present in small patches and rounded bodies.

Middle Pit (25 feet directly below upper pit): The vein at this point is much less mineralized and narrower, but some quartz is present and the argillite is somewhat impregnated with sulphide. Large amounts of sericite are present. The quartz and clay gouge along the fracture strike northwest, dip 85° northeast.

Lower Pit (50 feet below the middle pit and 5 feet above the river): The pit and tunnel runs northeast along a vertical seam from 3 inches to 2 feet in width lying in jointed argillite which strikes E-W and dips 70° to the north. The rock is thoroughly sheared to a black serpentine-like gouge. The seam extends from this pit to the middle pit, but in the lower pit there are some small lenses showing disseminated and massive pyrite, together with some galena and chalcopyrite. Assays by the State Laboratory on this material were very low.

Informant: C. J. Colcord; J.E.A. (10/12/38).

CURREY MINE	Trail Creek District	North Fork Area
(See French Diggings)		

DAVIS (Placer)	North Fork District	North Fork Area
(See also North Fork Placers)		

Ralph Davis, Inc., has acquired property 16 miles east of Dale on the North Fork of the John Day River. This property includes ground formerly controlled by M. R. Senter of Portland above Oriental Bar and five placer claims acquired by C. E. Silbaugh of Baker. The plant began operation in February 1940 and consists of a $4\frac{1}{2}$ cu.yd. Monighan dragline with an 85-foot boom, digging capacity of 5000 yards per day and a floating washing plant. Testing indicates a 5-year operation. See "North Fork Placers" for further details.

Informant: Oregon Mining Review, October 1940.

DREAM CLAIMS (Chromite) Desolation Creek District North Fork Area

Owners and Operators: John Temple, Pilot Rock, Oregon, and Claude Scrivener.

Location: Located two miles north of Olive Lake near Chrome Springs in the SE $\frac{1}{4}$ sec. 9, T. 9 S., R. 34 E. W. M.

Area: Five unpatented claims named the Dream 1, 2, and 3, and the Black Hawk 1 and 2.

History: The original group located by the Olive Lake Chromite Company in 1917, contained 13 claims. These claims were worked during World War I and the chromite hauled with wagons to Sumpter. The value of the chromite mined is said to have been \$1200. John Temple, one of the present owners, was interested at that time.

After the war the price of chrome dropped, and the claims were abandoned. In 1939 John Temple and Claude Scrivener relocated.

Development: About twenty pits have been dug on the claims. The openings made by the Olive Lake Chromite Company have caved.

Geology: The chromite occurs in a serpentine zone near Olive Lake. The size of this body was not determined. On the west side of the forest road passing Chrome Springs, the chromite occurs in small segregations ranging in size from a match head up to a man's fist. It is estimated that from 5% to 15% of the rock is chromite. Picked specimens from pits in this section (about two claims) ran from 25% to 35% Cr₂O₃.

About 500 yards east of the road, there are two large pits which are said to have been entrances to tunnels used by the Olive Lake Chromite Company in 1917-18. About 15% of the rock in a fracture zone, approximately 6 feet wide and striking S. 30° E., is said to have been chromite. The chromite in this zone occurs in kidneys ranging in size from 2 inches to 10 inches in diameter. A composite sample of picked specimens from the dump ran 45% Cr₂O₃. No chromite was exposed outside of this zone.

Remarks: Very little development work has been done, but it would appear that the best chance for finding chromite would be in the old Olive Lake Chromite Co. workings. The workings west of the road contain no ore that could be sorted, whereas there are segregations in the old workings which are large enough to sort.

Informant: John Temple, Pilot Rock; H.K.L. (6/27/40).

FRENCH DIGGINGS (Placer) Trail Creek District North Fork Area
(Currey Mine, Klondyke)

Owner: H. E. Currey, Portland, Oregon.

Location: "These placers are located in secs. 20 and 29, T. 7 S., R. 36 E. They are also known as the Currey mine and occupy several hundred acres in a compact area that extends from the summit of the divide at 6800 feet elevation between North Fork of John Day River and Trail Creek down to the latter stream at a point about 6 miles above its mouth and at an elevation of 6000 feet."

Area: Located in Trail Creek district 12 miles north of Granite. The upper

French diggings were located in 1883 by two Frenchmen named Thibadeau and Nado. These claims extended from the divide between the North Fork of the John Day and Trail Creek in a northwesterly direction down to Trail Creek.

The lower claims adjoin and extend down and along Trail Creek in a southwesterly direction. They were located and worked by Dr. Louis Marrotte and Dr. A. Marrotte.

History: "This deposit, which was discovered in the 'early days', has been extensively worked and is reported to have produced more than a million dollars' worth of gold. Based upon a minimum yield of 10 cents per cubic yard, a rough estimate of the volume of gravel mined shows that the production has not been less than \$387,000. Present operations are confined to the portion of the deposit adjacent to Trail Creek, where a small giant is operated by lessees."

Both the properties were acquired in 1906 by Dr. H. E. Currey and after his death in 1927 by his son H. E. Currey Jr. There are said to be one and one half million yards of virgin ground, averaging 26¢ per yard. Equipment consists of giants, pipe, 5 cabins, and 24 miles of ditch.

Geology: "Above 6400 feet elevation the deposit represents an undisturbed part of the Tertiary pre-tuff-breccia gravels but below that level they have been disturbed and modified by glacial action, and have assumed the character of glacial drift. In 1914 a 10-foot bank of gravel containing abundant cobbles and boulders was being worked. About 75 percent of the cobbles and boulders, some of which are decomposed, consist of granodiorite and the remainder of chert and other rocks characteristic of the Tertiary gravel higher up the slope. The matrix is a compact sandy clay.

"The gold, which occurs as small, flat, smooth particles worth \$17 or more per ounce, is said to be practically confined to a 3-foot layer of indistinctly stratified gravel that rests on the granodiorite bedrock. The deposits are said to be worked at only a moderate profit."

Idle at present (1940). H.K.L.

Informant: Sam Marrotte, Whitney; H.K.L. (9/8/40) (not visited).

Reference: Parks and Swartley 16:97 (quoted).

KLONDYKE (Placer)

North Fork Area

(See French Diggings)

NORTH FORK (Placer)

North Fork District

North Fork Area

Owners: Ralph Davis Inc., Dale, Oregon and Boise, Idaho. Property formerly owned by M. R. Senter, SE 9th and Main Sts., Portland, Oregon; Tiejie Senter; and Joe Vandermeer. (See also "Davis").

Location: E $\frac{1}{2}$ sec.10, S $\frac{1}{2}$ sec.11, N $\frac{1}{2}$ sec.14, T.7 S., R.33 E.

Area: 18 placer claims totaling 357 acres situated on both sides of the North Fork of the John Day River.

History: On either side of the mouth of Lick Creek (center of S $\frac{1}{2}$ sec.11) there have been quite extensive old workings on a high bar 50-75 feet above the

river. This work is said to have been done in the 1890's. Property is now being dredged by Ralph Davis Inc. (which see).

Miscellaneous: Climate hot in summer. Up to 3 feet of snow in the winter. Water from tributary creeks available for 2 or 3 months of the spring. River grade is gentle. This property was being prospected by Mr. Hurlburt at the time the property was visited. 5 test holes 5 to 8 feet in diameter were sunk.

Development: About 1000 cubic yards have been moved (to a depth of 15 to 20 feet) on the old high bar at Lick Creek.

Geology: The gravels average 100 feet in width and 10 feet in depth, extending for a distance of 2 miles on this property. Boulders reach a maximum of from 6 to 10 feet in diameter, but average less than two feet, with a fine gravel and sandy matrix. There is no clay. Bedrock is granite. The gold ranges in size from coarse to flour gold, about 30 percent of the gold being in the latter class. Gold appears from 6 inches to several feet above bedrock, but none on bedrock.

At Lick Creek the valley widens to about 1/4 mile with sloping bars on both sides of the mouth of the creek, rising to about 75 feet above the river. Boulders in these old workings were usually less than 2 feet in diameter and the gravels from 6 to 15 feet in depth. The bar was partly an alluvial fan which forced the river south against granite cliffs. There is a gorge for 1/4 mile below this point.

The sampling outfit used by Mr. Hurlburt consists of a washing box 6 feet long and 22 inches wide leading to a sluice 1 foot wide and 10 feet long having a fall of 1 inch to the foot. Riffles consist of metal lath over burlap and metal door mat. Mr. Hurlburt says that this catches all the gold. None can be panned in the tailings. These bars are said to run \$0.40 per yard in gold.

Informant: Hurlburt; J.E.A. (10/13/38).

NORTH FORK CLAIMS (Placer)

North Fork District

North Fork Area

Claims on the North Fork of the John Day River from Oriental Creek east:

Oriental Mine, 8 $\frac{1}{2}$ claims
North Fork Mine, 18 claims
Gulliford Mine, 1 claim

Curly Leach, 1 claim
Wilfloy (at Big Creek) 1 claim
Bennet, Hood River, 1 claim

Claims on North Fork of John Day River going west from Oriental Creek:

Mrs. Reynolds, Ukiah, 1 claim
B. L. Reynolds, Ukiah, 1 claim
Harry Reynolds, Ukiah, 1 claim
Sam Chilson, Ukiah, 1 claim
W. H. Phillips, Portland, 1 claim
Leonard Aldin, Walla Walla, 1 claim
C. F. Turnbull, Ukiah, 1 claim

Fred Shaer, Portland, 1 claim
W. L. Synder, 1 claim
E. F. Turnbull, Ukiah, 1 claim
Verne Kuhl, Hood River, 1 claim
C. F. Colcord and Albert
Anderson, 2 claims
Curtis and Haynes, 1 claim

Most of these claims have been purchased or leased by Ralph Davis Inc. of Boise, Idaho; and a dredge is being placed on the river. (4/16/41).

Informant: Walter Allison; J.E.A. (11/25/38).

NORTH FORK MINE (Klopp Placers) North Fork District North Fork Area

These placers are in secs. 32 and 33, T.7 S., R.35 $\frac{1}{2}$ E. "The intersecting gravel deposit known as the North Fork or Klopp mine is situated on the south bank of North Fork of John Day River, opposite the mouth of Trail Creek. Adjoining it on the east is the placer mine of David West on Onion Creek, and to the north across the river are the now idle Dadum placers. All of these mines are situated on parts of the same or similar deposits, and may be conveniently described together.

"Mining has evidently been carried on here for many years, the size of the water-supply ditches and of the abandoned portions of flumes and hydraulic equipment showing that some of the former operations were on a large scale. Records of production are lacking but the reports of miners and others familiar with this locality agree that the operations though usually profitable were never richly productive. The volume of gravel worked to date in these mines is roughly estimated to aggregate 6,800,000 cubic yards, which, at a minimum of 5 cents per cubic yard, must have yielded at least \$342,000. During the season of 1914 Glenn and Henderson were operating two 4-inch giants at the North Fork Mine, and Davis West a small giant on the Onion Creek slope.

"The gold-bearing material covers about one square mile in a compact area that lies mainly on the south side of the river. The gravel extends from the river's level about 500 feet up the hills on both sides and is shown by the workings to be 60 feet or more deep in places. In this area most of the top layer and small percent of the deeper portions have been mined. The few exposures of the bedrock show it to be very irregular and to contain no well-defined channel.

"The gravel bed is a compact unassorted mass of sandy clay and rounded to angular cobbles and boulders. In places the latter comprise 30 or more percent of the whole. Many of them are very large having dimensions in extreme instances as great as 10 feet. The cobbles and boulders are principally of granitic rocks with a sprinkling of schists and a small percent of lavas. In addition a very few small cobbles of unmetamorphosed argillite are distributed through the mass. Although many of the boulders are firm and fresh looking, some are rusty and thoroughly decomposed. Fine particles of gold are distributed through the mass as deeply as it has been exposed, but accounts agree that the thin top layer is proportionately much richer than the rest. The gold is worth about \$14.50 per ounce or is about 700 fine.

"This heterogeneous deposit ends about 1/4 mile below the mouth of Trail Creek, and gold has been recognized in commercial quantities for about 3/4 mile above the same point. The same bouldery mass extends up the valley of the North Fork and its main tributaries well into the basins in which they head, but it does not contain gold in commercial quantities.

"The deposit is clearly the terminal portion of an old drift sheet laid down by the North Fork glacier. As gold-bearing moraines are very rare and of exceptional occurrence, the presence of gold in this one and its localization at the lower extremity suggest problems of particular interest. Adjoining this glacial deposit on the south is a broad valley known as Crane Flats to which Crane and Onion Creeks flow from the vicinities of the La Belleview and Monumental Mines. These streams, particularly Crane Creek, contain gold-bearing wash that merges into the sheet of gravel covering Crane Flats. This gravel sheet is similar in composition and general characteristics

to the terrace gravels of the general region, which are known to be of pre-glacial age. To the northwest across the river along Trout Creek there are terraced gravels which are similar in composition and occur at about the same level as those of Crane Flats. Although now separated by the North Fork valley, 200 feet deep, these two deposits are thought to be remnants of one continuous sheet. As is discussed in the following paragraphs it is believed that this ancient gravel sheet is the immediate source of the gold in the morainal deposits of North Fork.

"It is observed that all of the various kinds of rock fragments in the North Fork deposits except two, those composed of lava and argillite, can be traced to parent outcrops along the path of the North Fork glacier, and as these exceptions are the most common kinds of rocks in the Crane Flats gravels, the suggestion is had that these gravels supplied the argillite and lava cobbles and the gold as well to the new deposit.

"At the close of the terrace gravel epoch the North Fork is thought to have deepened its valley, separated the Crane Flats and Trout Creek gravel sheets, and produced at this point by reconcentration of these gravels a rich placer deposit. Subsequently the glacier descended the valley, plowed up the gravels and incorporated them with its own debris, but failed to render them absolutely unworkable or to sweep them away.

"Since the disappearance of the ice, ordinary weathering and erosion have slightly worn down the surface of this deposit enriching its superficial portion by removing barren soil and sand and leaving the gold behind".

The North Fork Mine (Klopp Placers) is now owned by W. T. Small, who has been carrying on a hydraulic operation for several years. This property was not visited. J.E. A. 1938.

References: Parks and Swartley 16:163 (quoted)
Pardee and Hewett 14:122

OREGON GULCH (Placer) North Fork District North Fork Area

Owners: Fred C. and Reba E. Peterson.

Location: About 1 mile above the junction of Oregon Gulch and the John Day River in the center of the SW $\frac{1}{4}$ sec.15, T.8 S., R.34 E.

Area: 1 placer and 1 quartz claim.

History: These old diggings were worked in the 1890's and about \$500 was taken out, according to Ed Jacobs, Ukiah.

Equipment: Cabin, sluice boxes, and tools.

Miscellaneous: Timber mostly thick second growth. Season only 90 days for plenty of water.

Geology: Bedrock composed of old schists, argillite hornfels, and cherts. There are numerous bull quartz stringers and veinlets cutting these rocks. Some float boulders above the claim assayed \$9.80. The placer is in a gulch, which averages 10 to 15 feet in width. Boulders average about 8 inches in diameter, although some are as large as 3 feet. The bedrock is rough and

Informant: Frank Klein.

REYNOLDS (Placer) North Fork District North Fork Area

Owners: H.D., H.L., and L. Reynolds, Ukiah, Oregon.

Location: sec.9, T.7 S., R.33 E., about 1 mile below the mouth of Oriental Creek.

Area: Three unpatented placer claims called Robin, Blue Bird and Meadow Lark.

Equipment: Gas engine and pump, sluice box 1x8 feet with metal lath, rug and metal door mat. Grade 4 inches to the foot.

Geology: Granite bedrock. Gravel from 2 to 8 feet in depth. Large boulders are frequent. Bedrock is rough. Most of the gold lies on or near bedrock. If the gold is on top, it is not found below on the bedrock; and vice versa. Flakes occur up to 5 mm. Some nuggets have been found valued at \$.50, \$1.50, \$2.50, and \$3.50. This operation is in the middle bed near the middle of the river.

Four shipments of gold have been made; 3 ounces are obtained from about 85 cubic yards. A few places show 1 ounce in a few yards. Occurrence of gold is very spotty. Gold occurs in small pits and cracks in the decomposed granite and diorite bedrock, but does not stay in holes of larger size.

Informant: B. L. Reynolds; J.E.A. (10/13/38). This property was not visited.

ROCK BAR (Placer) North Fork District North Fork Area

Owners: Will Curtis and A. M. Haynes, Pendleton, Oregon.

Location: 100 yards below mouth of Camp Creek, on John Day. NW $\frac{1}{4}$ sec.6, T.7 S., R.33 E.

Area: 1 unpatented placer claim.

History: Some old ditching. Very little work done. Located in 1938.

Equipment: Gas engine, pump, hose, sluice boxes, and tools. There is ample timber and water on the property.

Geology: Argillite bedrock; bar is about 100 feet wide and 250 feet long; now working on bedrock at depth of 6 feet. Gold is mostly fine, but somewhat coarser on bedrock. Bar has large boulders; gravel is mostly sandy; some clay present. No test-pitting has been done. About 50 yards mined at 25¢ a yard, from which about 2 $\frac{1}{2}$ ounces was recovered. Now running about \$1.00 per yard. One clean-up yard ran 90¢. About half the gold is recovered from the top layer, the rest from bottom.

Informant: Will Curtis; J.E.A. (10/12/38).

THORNBURG PLACER MINE North Fork District North Fork Area

Owner: Ralph Sipe and Joe Davis, Baker, Oregon.

Operators: L. C. Thomas, Les Fitch, and Frank Thompson, all of Granite, Oregon.

Location: Located at head of Trout Creek in NE $\frac{1}{4}$ sec. 3, T. 8 S., R. 34 E.

Equipment: Bagley dragline, 2-inch grizzly, and sluice boxes (size 70 feet by 24 inches, and 70 feet by 12 inches).

The operators have installed the equipment. They intend to operate in the spring of 1941.

Informants: L. C. Thomas; H.K.L. (12/6/40).

KERN (Placer)

North Fork Area

Owners are W. Karp and others.

Located on the north fork of the John Day River north of Granite. Located in 1936 and consists of one 160-acre unpatented placer claim. Little development work has been done, but the owners plan to get into production soon.

Informant: Prescott (6/15/37).

QUARTZBURG AREA

Geography:

The Quartzburg Area is bounded on the south by the John Day River, on the east by the Grant County line, on the west by Bear Creek (just west of Prairie City), and on the north by the John Day Highway east of Dixie Mountain summit, and by the divide between the middle and main forks of the John Day to the west of the summit, with the exception of a small area north of the divide in sections 13, 14, 15, 23, and 24, which includes the headwaters of Ruby Creek. The Quartzburg district proper usually is limited to the drainage of Dixie Creek and its tributaries, including the Dixie Meadows property.

"Altitudes within the district range from about 3500 feet at Prairie City to 7400 feet at the top of Dixie Butte. . . . The district is reached by way of Prairie City . . . which lies on the John Day Highway, an excellent automobile road joining Ontario, on the Snake River, with Arlington, in the Columbia Valley. The former postoffice of Comer, about 6 miles north of Prairie City at the forks of Dixie Creek, has long since been abandoned.

"Heavy woods clothe most of the hillsides in the district, and much of it is embraced in the Whitman National Forest."

Geology:

"The dominant rocks of the district are meta-andesite, meta-diorite, and related volcanic rocks, including tuff, associated with which are small amounts of argillite. The correlation of these old sedimentary rocks must await detailed mapping, although the writers' impressions are favorable to Lindgren's (Ol:pl.64) correlation of them with the Carboniferous argillite series of Elkhorn Ridge.

"Intrusive into this series of volcanic and sedimentary rocks, and doubtless in large degree the cause of their intense alteration, is a considerable variety of plutonic rocks, among which gabbro, serpentine, and diorite are most prominent. Dikes of diorite porphyry, albitized diorite, and metadiabase are associated with these plutonic rocks and are probably comagmatic with them.

"Most of these rocks are considerably sheared and altered--the volcanic rocks by the development of biotite and tourmaline, the intrusive rocks by the development of talc, biotite, uraninite, and tourmaline. Some of these alterations may have occurred during the later stages of consolidation of the basic intrusive rocks themselves. Others, however, seem to be attributable to a group of later intrusions represented by small stocks of quartz diorite and granodiorite that occur in the valley of Dixie Creek below the forks and near the head of Ruby Creek. The numerous dikes of quartz diorite porphyry, granodiorite porphyry, and quartz monzonite porphyry that occur in many places through the district may attest a much wider distribution of these silicic rocks at depth.

"These quartzose rocks are practically free from crushing and are relatively unaltered. For these reasons they are believed to be younger than the basic intrusive rocks of the district. The age of these intrusive rocks is not accurately known from local evidence, beyond the fact that they are

all definitely pre-Miocene. In the Strawberry Range, across the John Day River to the south. Jurassic rocks are intruded by quartz diorite. This supports Lindgren's assignment of the intrusions to a post-Jurassic age. The basic intrusions may be older than this, however. The pre-Miocene age of all the intrusions is fixed by the fact that the Columbia River lava, of Miocene age, rests on an eroded surface cut across all the plutonic rocks. Lindgren (Ol:596) believed the intrusive rocks to be of early Cretaceous age.

"The Columbia River lavas crop out along the north side of the valley of the South Fork of the John Day River at Prairie City and apparently completely surround the mineralized area of the Quartzburg district. They have, however, been removed by erosion from the mineralized area itself, most of which, if not at all, must once have been covered by them. No study was made of the details of the geology of the Columbia River lava, as the formation has no bearing on the geology of the mines.

"Although the regional distribution of the rocks of Eastern Oregon strongly suggests an eastward strike as dominating the structure of the pre-Tertiary rocks, few observations were made on the structure of the stratified rocks within the Quartzburg district. The local structure is accordingly uncertain. Observations were sufficient, however, to permit the statement that the dominant structural features of the district are those imposed by the igneous intrusions.

Ore Deposits:

"Two types of ore deposits have been recognized in the district: quartz-carbonate-sulphide fissure veins and a quartz-tourmaline-chalcopryrite replacement body. The fissure veins are valuable chiefly for their gold, although small amounts of copper and cobalt have been won from them; the replacement body has its potential value in copper. Mineralization has occurred in nearly all the pre-Tertiary rocks. Although the observations within the district were not thorough enough to be conclusive, the ore deposits are probably derived from the quartz diorite intrusions.

"The veins consist of quartz, ferriferous dolomite, and calcite as the chief gangue minerals and carry the metallic minerals, pyrite, arsenopyrite, glaucodot, cobaltite, native bismuth, bismuthinite, tetrahedrite, pyrrhotite, chalcopryrite, sphalerite, and galena. The pyrite and chalcopryrite are the most plentiful, but the cobaltiferous minerals glaucodot and cobaltite are found in several localities. Supergene minerals recognized include covellite and bornite, and the oxidation products malachite, jarosite, and limonite were seen.

"The quartz-tourmaline replacement body carries disseminated chalcopryrite, pyrite, cobaltite, hematite, bornite, and covellite."

Reference: Gilluly, Reed and Parks 33:85-88 (quoted)

History:

According to Parks and Swartley 16:272:

"The Dixie Creek placer mines were discovered in 1862, and soon after that date the quartz veins on the west fork were found and have been worked

intermittently at least since 1880. Lindgren states that the production to 1900 is not believed to have exceeded \$100,000, and the production since that time has been considerably less.

"No change of Lindgren's report of 1900, which is quoted below, is to be noted. Locally the gross production from the Dixie Creek placers is reported from \$600,000 to \$6,000,000. Probably the lesser amount approximates the truth".

"The Dixie Creek placer mines were discovered about 1862, and were reported rich, though no data as to production are at hand. Raymond's report for 1870 contains the statement that at that time there were 100 white men and 200 Chinamen employed, and that the fine, scaly gold was 860 fine. In 1873 the creek is reported as turned over to Chinese labor. In 1882 two small hydraulic plants were in operation, producing \$30,000 (Mint report). At the present time very little placer mining is done".

ANDREW JACKSON CLAIM (Gold) Quartzburg District Quartzburg Area

"The Andrew Jackson property consists of one claim on the West Fork of Dixie Creek just above the Sherbandy group of the Copper Mountain Mining Co. The claim is owned by Mark Carmichael and Helbert Schoenthal. There are an open cut and two small tunnels, aggregating 145 feet of drifts, on the claim. The country rock is greenstone and diorite. At least two small seams of quartz are exposed. These seams average about 3 inches in thickness and contain a little gouge. One strikes N.20° E. and dips 80° E.; the other strikes N.65° and dips 65° W.".

According to A. W. Ward, Prairie City, this is open ground. H.K.L.10/31/40

References: Gilluly, Park and Reed 33:98. (quoted).

BLACK PRINCE PROPERTY Quartzburg Area
(See Prindle property)

BOULDER GROUP (Gold) Quartzburg District Quartzburg Area

The Boulder Group on the point of Dixie Mountain 4 miles from the east branch of Dixie Creek is owned by Lew Roberts of Prairie City, Oregon.

"The Boulder group of seven claims is near the head of the west branch of Dads Creek. The property is reached from Prairie City by about 8 miles of road and a 3-mile trail.

"The work done aggregates about 1000 feet, chiefly drifts and crosscuts on two levels about 100 feet apart. No production has been made.

"The country rock consists chiefly of porphyritic meta-andesite, silicified and altered to a very dense, hard rock. Possibly some old pyroclastic rocks are included. It is cut by a few dioritic dikes and by faults and fissures that trend generally N.70° E. to S.70° E. and dip steeply southward.

"The mineralization consisted of silicification and impregnation of the walls of a fault with sulphides and arsenides. Veins that range from a knife-edge to 4 inches in thickness follow the fault walls. Pyrite, arsenopyrite, chalcopyrite, sphalerite, pyrrhotite, and glaucodot were noted,

"Mr. Roberts reports that picked ore in the mine assays as high as 8 percent of cobalt, 2 percent of copper, and \$2 in gold to the ton. It seems unlikely that large tonnages of this tenor are present".

Owner: Arthur E. O'Brien, Prairie City, Oregon.

Area: 2 unpatented lode claims and fraction on the north-south vein and 4 on the east-west cross vein. Timber abundant. No water. Road 1/2 mile from the Dixie Creek road.

History: Small \$50 pocket of leaf gold was taken out in 1937. Considerable pocket hunting in small shallow pits was done many years ago on the east-west vein.

Geology: The north-south vein which has been developed for about 500 feet by a single drift, varies from 3 to 8 inches in width and shows relatively little mineralization. The vein is nearly vertical. It is said that it milled an average of \$15 a ton, that about \$35 has been taken out, and that it was very pockety. There are many open cavities. The ore shows large amounts of hematite in veinlets and cavities filled with limonite along fractures. There is some copper stain (chrysocolla?). The country rock is altered andesite, with perhaps some argillite. There are frequent brecciated patches. Just south of the entrance of the main tunnel there is an old shaft which is said to have been 70 feet in length, and across the gulch 30 feet farther south a drift, now caved, has apparently been driven on the southward extension of the vein. 600 feet north from the tunnel entrance, or about 50 to 100 feet beyond the drift end, outcrops on an east-west vein show on the surface for at least 200 feet. It is said that numerous gold pockets have been taken out of this vertical east-west vein which is composed of bluish quartz.

COLORADO MINE Quartzburg Area
(See Quartzburg Mining Company, Inc.)

"L. Comini & Sons have opened three small quarries in diorite about 4 miles up Dixie Creek from Prairie City.

"The stone differs in color in the three quarries, that in the quarry nearest to the town being darkest and that in the quarry farthest away being

lightest. In 1930 practically all the work was being done in the middle opening. The rock is a moderately fine-grained gray diorite but contains a large number of dark inclusions, which are of course very undesirable in monumental stone, leading to a considerable waste in partly worked stone. Efforts were being made to find an area free from these inclusions, which, however, had not been done at the time of visit."

Some monumental stone was quarried and dressed in 1937 and 1938 by Sutherland and Bentley. The quarries have been reported inactive for the past two years.

Reference: Gilluly, Reed and Park 33:104-105 (quoted).

COPPER MOUNTAIN GROUP (Copper) Quartzburg District Quartzburg Area
(Including Sherbandy Group)

According to William R. Clark, Prairie City, Oregon, the owner of the Sherbandy Group is John R. Kraig, Missoula, Montana.

"The property of the Copper Mountain Mining Co. embraces 11 claims on Cougar Ridge, west of East Fork of Dixie Creek, in sec. 1, T. 12 S., R. 33 E. Four of the claims, called the Sherbandy group, were patented. The property is about 8 miles from Prairie City. In 1930 it was under the management of V. E. Ryan.

"The claims constituting the Sherbandy group were located in 1896 by Capt. Homes Sherbandy and his son Byron. Development work was confined to a few shallow cuts and two short tunnels until the spring of 1930, when the present owners, who had taken over the property in 1929, began driving a crosscut about 300 feet below the apex. At the time of visit this crosscut was about 80 feet long. The total underground workings amounted to less than 400 feet. No production has been made.

"The country rock consists of altered andesite and diorite, cut by some dikes of granodiorite porphyry. Several narrow veins are exposed in the tunnel. Most of them strike N. 45° E. and dip steeply southeast. Some are fault veins and show brecciation, sericitization, silicification, and sulphide impregnation of their wall rocks in zones that extend 2 to 6 feet from the veins. One of these fractures follows a much decomposed dioritic dike that trends N. 35° E. The more intense mineralization, however, seems to have been but slightly controlled by these fractures. The most prominent mineralized bodies are tourmaline-quartz-chalcopyrite replacement masses in the greenstone. These bodies trend in general east to northeast. Some show elongation along steeply northward-dipping fractures with trends N. 60°-85° E.; others seem independent of each control. The tunnel being driven in 1930 had as its objective the discovery of the intersection of a vein that runs N. 30° E. and dips steeply west with a generally eastward-trending tourmaline-quartz mass.

"The minerals present are pyrite, chalcopyrite, and bornite in a gangue of tourmaline and quartz, with a little sericite and a clay mineral that resembles beidellite. Malachite, azurite, and limonite occur in the gossans".

This property is idle. H.K.L. (12/2/40).

Reference: Gilluly, Reed and Park 33:99 (quoted).

COPPEROPOLIS (Copper)

Quartzburg District

Quartzburg Area

"The Copperopolis property is in sec.6, T.12 S., R.34 E., just west of the East Fork of Dixie Creek. It is reached by an 8-mile wagon road from Prairie City.

"The developments include several short tunnels and one about 1500 feet long that cuts the deposit at a depth of about 300 feet. About 250 tons of ore was milled in a small concentrator, which was closed in 1906.

"The country rock is blocky meta-andesite, metadiorite, and diabase in which is developed a steeply dipping replacement body of quartz, tourmaline and chalcopryrite. This replacement body is apparently localized along a fissure that strikes about N.60° E. on the surface. Mineralization followed this fissure from the Sherbandy group of claims to the Copperopolis ground. The surface outcrops in the Copperopolis claims show a replacement mass about 1000 feet long and 75 feet wide at the widest place, where an unreplaced horse of country rock 35 feet wide is included. On the tunnel level, however, the mass is much reduced to a body of about 40 feet wide split by a 5-foot gouge mass. It is apparently controlled by fractures that strike N.45° E. and dip steeply and is itself sheeted by steep fractures that strike N.20° W. It is almost wholly composed of milky quartz, with scattered nests of pyrite, chalcopryrite, and tourmaline. Small amounts of magnetite, hematite, cobaltite, tetrahedrite, bornite, galena and sphalerite occur. Crosscuts have been driven across both ends of this replacement body. In all directions the mass has remarkably sharp boundaries; although seams of flamboyant quartz, dolomite, and chalcopryrite extend out in several directions, they are all of negligible width.

"Assays representative of the mass as a whole are not available. Considered as a copper ore it must be of rather low grade, but this may be in part compensated by the gold content, which according to some picked samples, may run close to \$1 to the ton.

"The mineral sequence is apparently tourmaline, quartz, and sulphides."

Reference: Gilluly, Reed and Park 33:100-101 (quoted).

COUGAR GROUP

Quartzburg Area

(See Minty Group)

DIXIE CREEK (Placers)

Quartzburg District

Quartzburg Area

"The Dixie Creek placer mines were discovered about 1862, and were reported rich, though no data as to production are at hand. Raymond's report for 1870 contains the statement that at that time there were 100 white men and 200 Chinamen employed, and that the fine scaly gold was 860 fine. In 1873 the creek is reported as turned over to Chinese labor. In 1882 two small hydraulic plants were in operation, producing \$30,000 (Mint report). At the present time (1900) very little placer mining is done.

"The placers consist of the gravels accumulated in the present creek to a depth of 10 or 15 feet. The workings extend upstream from Prairie for 5 miles, or to the entrance of the diorite canyon, where the grade becomes very steep. The width of the gravel-covered river bottom is from 300 to 800 feet, the whole of which has been worked.

"Six miles east of Prairie are the old Spanish Diggings, which have yielded a moderate amount of gold. The upper end of John Day Valley contains no placers. On the east side of Dixie Butte are the old placers of Happy Camp, still worked on a small scale by Chinese. Northwest of the same mountains are the Ruby Creek placers, still worked by whites and Chinese. Small placers are also reported from the head of Camp Creek". 1/

"Local estimates of production from the Dixie placers range from \$600,000 to \$6,000,000, with the smaller figure probably being nearer the true one." 2/

"In 1930 a dredge owned by the Empire Gold Dredging Co. and managed by R. C. Reese was operating in the gravel just below the town of Prairie City. This dredge had been installed on Canyon Creek just above John Day in 1916 and operated there for 12 years, digging between 300 and 400 acres of 12-foot ground. In 1939 it was moved to the Prairie City ground. It was digging 22 feet to bedrock in a pay streak about 700 feet wide. Mr. Reese estimated that a 4 to 5 year run remained ahead of the dredge at this site. The dredge has 6-foot buckets and a capacity of about 3000 cu.yds. a day, but owing to irregular power supply it operates only intermittently during the irrigating season". 3/

The England and Hilliard dredge moved from Powder River above Narrows below Sumpter October 9, 1938, to Dixie Creek, (See H.F.England and Co.), and moved from Dixie Creek to Trout Creek north of Burns in April 1940.

References: 1/ Lindgren 01:712

2/ Swartley 14:198

3/ Gilluly, Reed and Park 33/104

DIXIE MEADOW MINE

Quartzburg District

Quartzburg Area

The Dixie Meadows Mine owned by Mrs. G. H. Kight is being operated under lease and option by R. C. Reese of Prairie City, Oregon.

Location: Located near the head of Ruby Creek, just north of the Dixie Creek divide in sec.23, T.11 S., R.33 E.

Area: Ten patented claims.

History and Production: "The mine was opened in 1900 by Messrs. Kight and Reese. A mill was built in 1903. Between 1903 and 1910 about 8000 or 9000 tons of ore averaging \$8 at the old price of gold and \$14 at the present price to the ton in gold were milled and about 350 tons of concentrates averaging about \$50 to the ton were shipped. The property was sold to L. Vogelstein & Co. of New York in 1910, and a development campaign, with no attempt at production, was carried on by them for the next two years. The property was then sold to A. D. Coulter of Seattle and later, by combination with the Independence claim and the Sylvanite property in southern Oregon, it passed into the hands of the present owners. No production has been made since 1910 except a small amount by lessees in 1912-1914. The total production of the mine has been less than \$100,000, according to Mr. Reese.

"The mine is developed by two adits known as the upper Intermediate or Blacksmith and the lower or Ruby. The Blacksmith level is the main working level, and about 6000 feet of drifts and raises have been driven above this level. The Ruby adit is about 125 feet below the Blacksmith level and is about 1200 feet long. The first 500 feet is a crosscut to the vein and 700

feet of drifting on the vein southward towards the ore shoot. During the summer of 1940 R. C. Reese opened and retimbered the Blacksmith or main working level.

Geology: "The country rock of the mine is a complex of greenstone, meta-andesite, tuff, metadiorite, serpentine, and sheared quartz diorite, with a little argillite, the whole cut by several dikes of granodiorite porphyry. The metadiorite, which locally is a metagabbro, much serpentized, forms the footwall of the vein for some distance southwest of the accessible workings. The hanging wall is largely sheared diorite, with meta-andesite and metadiorite, in some of which tourmaline and metamorphic biotite have been developed, both minerals characteristic of unusually high temperature. Small amounts of argillite occur in both walls, as well as in horses within the vein, commonly near the footwall.

"The vein is localized along a fault and consists of quartz, which replaces the gouge and brecciated material between two rather distinct walls. The width between the walls, normal to the fault, is about 60 feet in the accessible workings. The vein strikes N.30°-35° E. and dips 65°-70° SE. Most of the filling between the walls is country rock, partly replaced by quartz, sericite, and sulphides. Probably less than 10 feet of this filling consists of quartz vein material, however, although most of the filling shows more or less silicification, sericitization, and impregnation with sulphides. The wall rocks bordering the fault zone are similarly altered.

"The vein is obviously a replacement vein for the most part, "ghosts" of the country rock being very common throughout it. The sulphides present are pyrite, arsenopyrite, chalcopyrite, pyrrhotite, galena, marcasite, and sphalerite. Microscopic studies show that there are two generations of pyrite. The earlier, euhedral pyrite, occurs in a quartz-carbonate gangue, and the later pyrite, with associated marcasite, in fractures and along boundaries of masses of pyrrhotite. According to Mr. Kight there was little or no pyrrhotite in the upper workings. The chief gangue mineral is quartz, but ferriferous dolomite and sericite are very common.

"The ore is but slightly oxidized, with the sulphides persisting practically to the surface. Accordingly the ore is rather base, probably less than one-fourth of the gold being susceptible of amalgamation. Cyaniding, however, has never been tried. When the mine was producing, the sulphide concentrate was shipped directly to the smelter.

"The tenor of the ore is very irregular. According to Mr. Kight, large quantities will average \$7 to the ton in gold. There was reported to be a particularly high-grade streak along the footwall, which was worked by a lease in 1912-1914 with good results, but its tenor is not known."

According to Bela Low's report made in 1912 there were 112,000 tons of ore which would average \$7.90 per ton or 250,000 tons, which would average \$6.50 per ton.

During the winter of 1938-1939, the Cornucopia Gold Mines had three men at work rehabilitating the workings to prepared for a sampling campaign.

Informant: R. C. Reese; H.K.L. (1/29/41)

References: Swartley 14:196

Parks and Swartley 16:

Gilluly, Reed and Park, 33:88 (quoted)

Very little gold lay on bedrock; it was scattered over the old surface as a result of old placer operations.

The ground is said to have averaged 20 cents per yard. The source of the gold appears to have been from the high grade pocket country from 4 to 7 miles upstream.

Description of Operation: This dredge is unique in that it places the sand and silt on top of the boulders and leaves the ground in a condition that approximates its original state. Gravel is dumped by the dragline into a 5 foot by 30 foot trommel screen with $\frac{3}{8}$ inch holes. The trommel is horizontal and on the lower deck. Oversize is carried through the screen by a spiral and dumped about 4 feet behind the boat. Undersize goes to a sump and is pumped to 4 Bodinson-Heath rougher jigs. Tailing goes to launders on upper deck, which carry it about 8 to 20 feet beyond the end of the boat. In this way the coarse gravel discharged from the trommel acts as a dam for the fine material and a level dump is maintained.

Rougher jig concentrate goes to 4 cleaner jigs, and cleaner concentrate to a Titan amalgamator. Cleaner jig tailings and amalgamator tailings go to the sump to be returned to the circuit by the sand pump.

Informant: W. A. Hilliard (1/30/41).

EQUITY GROUP

Quartzburg Area

(See Quartzburg Mining Company, Inc.)

FITZSIMMONS GROUP (Gold)

Quartzburg District

Quartzburg Area

Owner: Bank of John Day and Jim Cleaver, Prairie City, Oregon.

The Fitzsimmons group of five patented claims is on the hillside northwest of the East Fork of Dixie Creek, just above the old smelter.

During the summer of 1940 the Ellen B. Mining Co. had a bond and lease on the property. Tiller Brothers and J. W. Crews and sons worked two shifts driving 250 feet of drift on the Fifty Cent claim.

The vein, which lies between blue diorite walls, strikes N.12° E. and is almost vertical. Vein filling is quartz and gouge containing pyrite, galena and a small amount of free gold. Vein width varies from 6 inches to 3 feet, averaging about $2\frac{1}{2}$ feet. Values vary from \$25 to \$50 per ton.

The mine equipment consists of a portable compressor and 3 drifters. Jack bits are being used.

In October Tiller Brothers built a small mill on the East Fork of Dixie Creek. Equipment consists of a 3x3 Denver Ball Mill, 12-inch Denver spiral classifier, 2 26-inch Denver Flotation Cells, 8x12 inch Denver jig table.

"Considerable work has been done here in the past, but the tunnels are all caved and inaccessible. The material on the dumps is very similar to that of the Cougar and Dixie Queen groups. It is chiefly greenstone with some diorite. The greenstone contains considerable pyrite."

Informant: H.K.L. (10/26/40)

Reference: Gilluly, Reed and Park 33:96 (quoted).

FORRESTER GROUP (Gold)

Quartzburg District

Quartzburg Area

In July 1940 Walter Ross and William Clark of Prairie City, Oregon, located two of the eleven original claims of the Forrester Group. The remaining claims were open for location.

The Forrester group is located on a small stream flowing eastward into Dixie Creek just below the forks of Dixie Creek.

"The main tunnel has about 500 feet of accessible workings. There are two more small tunnels open and numerous surface cuts.

"The vein follows the contact of a dike of sericitic diorite porphyry in granodiorite and greenstone. This dike ranges in width from 20 to 60 feet and, according to Mr. Ward, has been traced for 2 miles on the surface. The vein follows the hanging-wall contact, striking N.5° E. and dipping 80° E. The dike has been crosscut, and the face of the workings is in greenstone. The walls of the dike are very irregular.

"Most of the country rock is medium-grained granodiorite that contains considerable quartz. Masses of greenstone, probably inclusions in it, are common.

"The vein consists of about 1½ feet of gouge and breccia with small amounts of quartz. The gold is both free-milling and base. Pyrite is the main sulphide, but others are reported to be present, though no others were seen.

"The so-called Old Forrester workings consist of a drift 185 feet long, a quarter of a mile southeast of the work described above. The drift crosscuts a dike 45 feet wide and then follows northward along the contact, which strikes N.15° W. and dips 85° E. This contact is followed by about 2 feet of gouge and clay. The country rock is granodiorite, and the dike material is very similar to the diorite porphyry described above.

"The vein in the old workings carries only about \$2 to the ton in gold. The main workings average better than this amount, according to Mr. Ward, but no figures were obtained."

Informant: William Clark; H.K.L. (10/31/40).

Reference: Gilluly, Park and Reed 33:96, 97, 98 (quoted).

HALEY CLAIM (Gold)

Quartzburg District

Quartzburg Area

Owners: J.E.Haley and Bradford, Prairie City; Ida and Robert Odell, Klamath Falls.

Location: Located on west side of West Fork of Dixie Creek 100 yards above the forks in the SW¼ sec.11, T.12 S., R.33 E.

Development and History: A 35-foot shaft was sunk a number of years ago on a high grade stringer and a tunnel was started to cut the vein at creek level about 400 feet below the outcrop.

In 1938 a 150-foot crosscut was started which cut the vein 100 feet below the outcrop. Some ore was milled in 1940.

Geology: The country rock is a fresh-looking very fine-grained quartz hornblende diorite, intruded by several small porphyritic dikes. The vein is from 8 inches to 2 feet in width at the outcrop and strikes N.20° E., standing almost vertical.

Informant: J.E.A. (10/16/38); H.K.L. (10/30/40).

HOWELL AND HAIGHT PROPERTY (Gold) Quartzburg District Quartzburg Area

"The property owned by Howell and Haight, of Prairie City, is on top of the ridge to the east of Dixie Creek and at the head of a tributary to Corral Creek. In 1930 there was a 30-foot shaft on the property, and at the time of visit this was being unwatered, preparatory to deepening.

"The country rock is diorite cut by a porphyritic diorite dike.

The vein consists of a high-grade streak, which forms the hanging wall of the porphyry dike and strikes N.20° E. and dips 45° SE. According to Mr. Howell there is also, in the dike just below, about 20 feet of ore carrying \$4 to \$5 to the ton in gold. The gold is free within the depth so far explored. Pyrite, quartz, and free gold occur along the contact and impregnating the dike. No production had yet been made in 1930."

There has been no production to date. H.K.L. (11/12/40)

Reference: Gilluly, Reed and Park 33:98 (quoted).

KEYSTONE GROUP (Gold) Quartzville District Quartzville Area

Owners: Eddie Powell and John A. Ward, both of Nyssa, Oregon.

Location: In sec.2, T.13 S., R.33 E. in a gulch west of the West Fork of Dixie Creek 7 miles from Prairie City.

Area: 5 unpatented lode claims.

Miscellaneous: "The Keystone vein, with the exception of having much calcite in it, is similar in strike, dip, width, values and mineral content as the Present Need Mine. The developed ore is practically exhausted to creek level and there has been little activity at the mine in the last few years".1/

"The old Keystone workings were entirely inaccessible in 1930." 2/

"The old Keystone, now idle . . . was worked in 1882, during which year the small veins of Quartzburg produced about \$12,000. . . about seven levels were run. In 1883 it is reported that 500 tons of ore at \$40 per ton were worked at a cost of \$8.50 per ton. In 1889 the mine is credited with a production of \$5,800. The vein strikes northeasterly and dips southeasterly. It is 4 feet wide between walls, the pay forming a narrow streak on the hanging, on the foot, or on both. The gangue contains much calcite, but otherwise the ore is similar to that of the Present Need." 3/

Since 1930 a new shaft has been sunk 85 feet below the third level. In 1933 a shaft was sunk on the vein from the surface, exposing a 9-foot width

with 4 feet of low-grade ore assaying \$8.50 for the base ore. Loose talc occurs on each side of the vein.

Informant: J.E.A. 10/16/38 (not visited).

References: 1/ Parks and Swartley 16:137

Swartley 14:196

2/ Gilluly, Reed and Park 33:93

3/ Lindgren 01:710

KLONDIKE CLAIM (Gold)
(See Minty Group)

Quartzburg Area

LAST CHANCE GROUP (Gold)

Quartzburg District

Quartzburg Area

"The Last Chance group consists of five claims near the head of Ruby Creek, just south of the Dixie Meadows mine. The claims are the property of G. H. Kight of Prairie City. There are about 400 feet of workings.

"The country rock consists of sheared gabbro, serpentine, greenstone (meta-andesite), argillite, and sericitized diorite.

"The objective of the workings is a mineralized shear zone that strikes N.60° E. and dips 60° SE. There has been considerable sulphidization and silicification of the footwall of the shear zone, but the hanging wall shows much less. Small veinlets and branching stringers of quartz and sulphides as much as 1½ feet thick occur.

"The diorite just above the hanging wall is much sericitized and carries some sulphides.

"The shear zone has been drifted on for about 150 feet. The minerals have been found to occur very irregularly, with some bunches of good ore, but much of the sheared matter is of very low grade. The principal sulphides are pyrite, galena, sphalerite, pyrrhotite, and a little chalcopyrite. The gangue is dominantly quartz with some ferriferous dolomite. Oxidation has been slight, and little of the gold is free. According to Mr. Kight the tenor is not very high, ranging from \$4 to \$8 to the ton, even in the highly sulphidic material".

Owner: George H. Kight, Prairie City, Oregon: H.K.L. (12/9/40).

Reference: Gilluly, Reed and Park 33:89 (quoted)

LILLIE JANE CLAIM (Gold)

Quartzburg District

Quartzburg Area

The Lillie Jane claim is owned by J. H. Edmundson, Prairie City, Oregon, and is located on the east side of Dixie Creek 1/4 mile below the mouth of Comer Creek in sec.26, T.11 S., R.33 E.

Informant: H.K.L.

MINTY GROUP (Cougar, Klondyke, etc.) Quartzburg District

Quartzburg Area

Owner: A. W. Ward and Mrs. Louise King, both of Prairie City, Oregon.

Location: Located on Cougar Ridge, between the two forks of Dixie Creek in sec.2, T.12 S., R.33 E.

Area: Eight unpatented claims known as the Cougar, Blue Mountain Chief, Klondike, Midnight, Blue Bird, Bonanza, Morning and Poorman.

Mr. Ward completed assessment work on all claims during the summer of 1940 and milled four tons of ore from the Klondike claim in Cam Reese's mill, which netted him \$192.

History: In 1936-1937 Mrs. M. J. Dolph operated the property under the name of Minty Gold Company; Harry W. Whitaker, 4808 Chicago Street, Omaha, Nebraska, president; Orvan D. Yokum, John Day, Oregon, vice-president; Mintie M. Dolph, 1226 S. Cedar, Spokane, Washington, secretary.

This property was idle in October, 1938, at which time development consisted of 400 feet of drift in the upper tunnel, with 150 feet on another nearly parallel vein a few feet to the west. There was 600 feet of drift on a lower tunnel, 150 feet below, on the same vein with a 150-foot crosscut to the west.

Equipment: Equipment consists of track in all tunnels, 3 cars, 75 feet of steel-lined chute from upper tunnel to mill, 8 section bunkhouse in good condition, and 3 other cabins.

Mill consists of 2-3/4 inch grizzly, 8-inch Dodge type crusher, automatic feeder, Brien roller quartz mill 8 feet in diameter, amalgamation tables (now removed), Wilfley table, rotary sand pump, dewatering cone, power from small boiler, 2 1-cylinder steam engines and 1-cylinder steam compressor, shafting and pulleys.

The vein in the upper tunnel of the Minty Group follows the east wall of a diorite-porphyry dike in the greenstone and consists of streaked white and grey quartz and gouge with some pyrite and chalcopyrite considerable mixed with broken country rock which is predominantly argillite. Calcite is common in 2 generations, both later than the quartz. Several porphyritic dikes cut the argillite. The vein strikes approximately north-south and dips 65°-80° to the east. In the upper tunnel it is 3 to 18 inches in width but averages less than 1 foot. The vein in the lower tunnel varies from 3 inches to 1 foot in width and is well defined but has never been stoped. In no place is it well mineralized. Several other tunnels to the east have attempted to develop parallel veins but these were not open when the property was visited. No production from them has been reported.

In describing the Klondike and Midnight or Paul Tote claims, Gilluly, Reed and Park say: "Klondike Claim: The property has been opened by several hundred feet of workings, partly in greenstone and partly in a diorite porphyry dike. This dike, which strikes N.25° E. and is 75 to 90 feet thick, cuts through the greenstone. The vein, consisting of about 2 feet of gouge and breccia, apparently follows the east wall of the dike. It strikes about N.25° E. and is either vertical or dips steeply east. About 33 tons of high-grade ore has been extracted from a small pocket. Very little quartz is present in the vein. The greenstone along the vein is locally impregnated with considerable pyrite."

"Midnight Claim: About 700 feet of tunnel has been driven, including about 300 feet of crosscut, and nearly 400 feet of drifts on two intersecting veins. A winze 22 feet deep has also been sunk.

"The country rock is all greenstone. The intersecting veins strike N.10° W. and N.10°-25° E., and both dip about 75° E. The two veins contain the same types of minerals, and there is no offset at the intersection. The vein that strikes east of north is 3 inches to 2 feet wide, the other has a maximum exposed width of 8 feet and pinches down to 6 inches. The vein material consists of sheared and altered greenstone, stringers of calcite, small amounts of quartz and pyrite, and chalcopyrite. Some fine sericite flakes coat fractures through the calcite.

"According to Mr. Ward, the average tenor of the ore in the northwesterly vein is \$7 to the ton in free-milling gold, with additional values in the sulphides."

Informants: A. W. Ward; H.K.L. (10/31/40); J.E.A. (10/17/38).

References: Gilluly, Park and Reed 33:94 (quoted).

Swartley 14:196

Parks and Swartley 16:82

OPHIR MINE (Gold)

Quartzburg District

Quartzburg Area

Owner: William Clark, Standard Oil Station, Prairie City, Oregon.

Location: S₂¹ sec.10, T.12 S., R.33 E., approximately 1 mile west of Dixie Creek.

Area: 11 unpatented lode claims.

Geology: All tunnels are in granite of varying grades from almost a diorite to a very light color. All "veins" are shear zones with a white gouge. Wide areas in the granite are criss-crossed by numerous limonite stringers. The tunnel visited runs more or less north and south. The vein systems followed, dipped uniformly to the east from 50° to 70°. Other intersecting systems dip northerly.

Development: There are 2 levels with openings as follows: 600 feet of drifting, 60 feet of crosscut in one direction and 70 feet in the other on the number 1 level, and 700 feet of drifting and 40 to 50 feet of crosscut on the number 2 level. These tunnels were caved when the property was visited. The third tunnel is about 400 feet long with a general southerly trend.

Informant: J.E.A. (10/17/38).

PAUL TOTE CLAIM (Gold)

Quartzburg District

Quartzburg Area

The Paul Tote Claim now known as the Midnight Claim is owned by A. W. Ward and is part of the Minty Group (which see).

PRESENT NEED MINE (Gold)

Quartzburg District

Quartzburg Area

Owner: Scotty Ross, Prairie City, Oregon.

"The Present Need Mine is on the West Fork of Dixie Creek about a mile above the forks and a few hundred feet below the Keystone workings. No activity has been reported at this mine since 1912, and none of the workings were accessible in 1930. It was under lease to Ed Gifford, who planned to

open and unwater the drifts. The property has been described as follows by Lindgren (01:710):

The Present Need was located about 10 years ago (1890) and has since been worked on a small scale, the ore being calcined in a kiln and then reduced in an arrastre. The developments consist of a crosscut tunnel 100 feet above the creek level and 200 to 300 feet of drifts. The country rock is diabase, but the crosscut has exposed a narrow, greatly contact-metamorphosed series of diabase tuff with a general east-west direction. The vein strikes N.20° E. and dips 70° ESE. Like the other veins in the district, it is not traceable for a long distance. The width is 2 to 3 feet, indicated by fissures in the hard diabasic rocks. The ore occupies from 4 inches to 2 feet of this width and consists of solid quartz with heavy sulphurets in irregular intergrowth. There are pyrite, hard and yellow, softer yellowish gray marcasite, and a little chalcopyrite, zinc blende, and galena. This ore is very rich, and the pyrite often contains free gold. It assays from 6 to 25 ounces silver and 4 to 5 ounces in gold per ton, a total value of about \$100. With the imperfect extraction used, only about two-thirds of this amount was saved. The ore occurs in two shoots on the vein, both dipping 65° S. on the vein; the shoots are 70 feet long and are separated by a barren zone of 70 feet.

"Since the time of Lindgren's examination the vein has been exploited to a point just above the level of the creek".

This property is inactive. H.K.L. (10/31/40).

Reference: Gilluly, Reed and Park 33:93 (quoted).

PRINDLE PROPERTY

Quartzburg Area

According to A. W. Ward, Prairie City, the owner of the Prindle property, formerly known as the Black Prince, is Frank B. Prindle, Prairie City, Oregon. Mr. Prindle has done assessment work every year and plans to work his claims through the winter of 1940.

"The Black Prince property is on the ridge 1½ miles west of Dixie Butte. It is reached by a mountain road from Prairie City, a distance of about 14 miles. The property is owned by William Walling, of Prairie City, and in 1930 was being developed by Frank B. Prindle.

"The prospect consists of one tunnel, slightly more than 750 feet in length, and a small open cut on the surface.

"The country rock is largely tourmalinized meta-andesite. Along a fault just inside of the adit portal meta-andesite porphyry occurs. This porphyry may be classified as a greenstone but is less altered than most of the associated rocks. A short distance northeast of the property is a small stock of quartz monzonite.

"The country rock has been tourmalinized, silicified, and sulphidized. The metallic minerals are largely pyrite, with much smaller quantities of magnetite, arsenopyrite, pyrrhotite, chalcopyrite, sphalerite, covellite, and glaucodot (?).

"The ore occurs in pockets along fine stringers. No prominent structural features seem to have localized the mineralization. In the tunnel there is one pocket containing considerable glaucodot (?). This pocket is in the lower part of the drift and does not extend into the back. Another similar pocket was found on the surface, in the present open cut. The adit was driven to connect with a supposed downward extension of this mineralized body exposed at the surface. The best grade of ore carries \$10 in gold to the ton, according to Mr. Prindle."

Informant: H.K.L. (10/31/40)

Reference: Gilluly, Park and Reed 33:90, 91 (quoted).

QUARTZBURG MINING COMPANY, INC. (Equity, Colorado)

Quartzburg District Quartzburg Area
Owners: The Quartzburg Mining Company, Inc., is mining on the Colorado or Equity Group owned by R. C. Reese. R. C. Reese, Prairie City, Oregon, is president and manager. His associates are L. J. Laycock and U. A. Jurva.

Area: The property consists of six patented claims located in a small gulch entering the West Fork of Dixie Creek from the south about 7 miles from Prairie City, Oregon. These claims lie in sec.2, T.13 S., R.33 E.

History and development: This property was discovered and located in 1878 and from that date up to about 1910 was worked almost continuously either by the owners or by leasers. The exact production is not known, but has been estimated from four to six hundred thousand dollars. Judging from the stoped areas these estimates would seem to be very nearly correct.

From 1910 until 1933 very little work was done on the property, for it had been worked out down to the lowest point which could be attained by drifting or crosscutting. In 1933 R. C. Reese and Frank Cornwell bought the property and organized a company . . . known as the Quartzburg Mining Co. Since that time two winzes have been sunk on the vein, each 75 feet deep and from the bottom of each winze some 50 or 60 feet of drifts have been driven. The width of vein and value of the ores in this work have remained the same as was found in the upper workings.

During 1940 the mine was worked by leasers who mined between 40 and 50 tons of ore taken from the edges of the old stopes where, before the rise in the price of gold, the values became too low to pay. About 45 tons was taken out, five tons was shipped to a smelter and the balance was milled in a 3½-foot Huntington mill which the Company owns. The 5 tons shipped averaged \$148 per ton, and the 40 tons milled averaged \$35 per ton. Fifty percent was saved by amalgamation and the sulfides were concentrated on a table.

Numerous small veins have been found which have a strike of about 10° N. of E. and dip about 85° E. These veins frequently carry very high values, but as a rule are too small to be worked profitably. The main vein, and the one on which practically all of the work has been done, has a strike of N.35° E. and dips 80° SE. Three distinct ore shoots have been found on this vein. Two of these have been mined out from the lowest level to the surface, a distance of 275 feet, and the third shoot has been mined out from the lowest level up to where it was cut off by a vertical fault. The combined length of the three ore shoots is approximately 350 feet.

"The Colorado vein has been opened by three levels, the top one 95 feet above the lowest. The vein has been stoped above the lowest level in some places to the surface, and the two upper tunnels are caved and inaccessible. A small amount of work has been done below the third level, but these workings are at present filled with water. The work being done in 1930 was 15 feet below the third level. The third level is about 750 feet long and has been stoped upward for 330 feet along the strike of the vein.

"The country rock is nearly all sheared gabbro, carrying labradorite phenocrysts in a finer-grained diabasic ground mass. Some dikes of granodiorite occur near the portal.

"The vein strikes about N.35°-45° E. and dips 75°-80° SE. The vein is composed largely of quartz, dolomite, and massive sulphides - pyrite, chalcopyrite, galena, and sphalerite. The wall rock is slightly sericitic close to the vein. The width of the vein ranges from practically a knife-edge at the face to more than a foot in the stopes.

"The vein is crossed by numerous shattered zones of gouge and fault breccia from 3 inches to 3 feet wide. Most of the movement along these breaks appears to have taken place before the mineralization. The quartz vein persists through several of the brecciated areas. There has been some postmineral movement, as the vein has been offset 3 feet in one place and possibly 17 feet in another. The faults range in strike from west to N.65° W. They all dip between 65°-80° N. Seven of these fault zones were observed within 200 feet of the face of the third level.

"The ore contains considerable massive sulphide and, according to A. W. Ward, of Prairie City, who was familiar with the mine when it was in active operation, carries as much as \$500 a ton in gold".

Informant: R. C. Reese, H.K.L. (1/26/40).

References: Lindgren 01:711

Parks and Swartley 16:91

Gilluly, Reed & Park 33:91-93 (quoted)

Swartley 14:196

SHERBANDY GROUP

Quartzburg Area

(See Copper Mountain Group)

STANDARD MINE (Cobalt and Copper)

Quartzburg Area

Owners: Controlled by the Mercantile Commerce National Bank of St. Louis, Missouri. The trust officer in charge is Joseph A. McCarthy.

The U.S. Vanadium Corporation of America, a subsidiary of the Union Carbide and Carbon Corporation, has taken an option on the Standard Mine, and work began in April, 1941.

Location: In sec. 12, T. 12 S., R. 33 E., about 7 miles from Prairie City on the East Fork of Dixie Creek.

History: In May, 1937, fire swept the property, destroying the old 75 ton mill.

"Development on the property began about 1880, but at the time of Lindgren's examination in 1900 only the upper tunnel and the inclined shaft, a

total of probably 600 feet of workings, had been driven. The mine was most actively exploited between 1900 and 1907, when about 4000 feet of development and considerable stoping were done. Except for a few feet of drifting in 1915 and the shipment of a few tons of ore to the Sumpter Smelter in 1923, the mine has since been idle.

"Data on production are very incomplete. Prior to 1900 the mine had shipped a few tons of chalcopyrite-gold ore from the shaft.

"In 1900 Lindgren reports a shipment of 10 tons of \$34 ore from the upper tunnel. D. F. Hewett, of the United States Geological Survey, who visited and mapped the mine in 1915 and whose notes have been freely utilized in the present description, obtained production data which show that the mine shipped about 104 tons of concentrate in 1906, yielding a net return of about \$50 a ton, and that the shipments in 1907 were about 311 tons, which yielded a net return of just over \$45 a ton. The concentrates averaged 60 cents in gold and a little less than an ounce of silver to the ton and 10 to 12 percent copper. According to Mr. Riley, some cobalt ore was shipped to the Edison Laboratory, but he was unable to state the amount or value of this shipment.

Development: "The Standard vein has been opened by an inclined shaft about 70 feet deep and by three adits at vertical intervals of about 80 feet. The upper tunnel was caved and inaccessible in 1930, but Mr. Hewett's map shows it to be 400 feet long. The middle level contains 600 feet of drifts. The lower level includes about 1700 feet of drifts and about 1000 feet of crosscuts. Part of the workings in the lower level are caved and inaccessible. There are numerous raises and stopes connecting the levels. No work has ever been done below the third level. . . .

"The country rock of the Standard vein is chiefly porphyritic andesite, with some vesicular andesite, cut by dikes of granodiorite porphyry and a few of diabase. The vein itself is localized along a fault, and there are at least four distinct fault-breccia zones crossing the vein. The vein strikes persistently N. 70° E. and dips steeply south. Much of the movement along the faults has been premineral, but in one place there is a slight jog in the vein, and in the face the vein appears to be faulted off. No work has been done beyond the immediate fault contact.

"There is one crosscut to the south from the Standard vein for about 400 feet. This cuts five small veins or mineralized stringers that strike N. 45°-80° E. and dip 60°-80° S.

"The Standard vein ranges in width from a few inches to 4 feet. It is not a persistent vein but rather a group of mineralized stringers with considerable replaced wall rock. The main gangue mineral is quartz, but some ferri-ferrous dolomite and calcite are also present. The ore minerals are pyrite, chalcopyrite, arsenopyrite, cobaltite, glaucodot, bismuthinite, native bismuth, galena, and sphalerite. The glaucodot, which has been called smaltite and safflorite in other reports is present in the deeper workings. Considerable cobalt bloom, erytherite, is present in the lowest drift, and some nickel bloom (?), jarosite, and malachite also occur. The average tenor of the ore is not known.

"The fault zone nearest to the adit is called the Grover Cleveland vein and has been drifted on for about 600 feet. It strikes N. 20°-40° E. and dips about 80° S. Most of this work is now caved. To the northwest of the Standard vein

another tunnel has been driven for 700 feet. This tunnel also cuts the Grover Cleveland vein, and some work was done here. The Grover Cleveland vein follows in part a dike of granodiorite porphyry and consists of a shattered and brecciated zone about 8 feet wide containing breccia, gouge, and small quantities of quartz, ferriferous dolomite, and sulphides. The ore is free-milling and carries about \$2 in gold to the ton according to Mr. Pinson, former manager of the company.

"The other fault zones that cross the Standard vein have not been followed at all. These fault zones consist of breccia and gouge and range in width from 6 inches to 3 feet. The exposures are very poor at the face, and nothing can be said regarding the fault that cuts off the vein.

"The Smuggler vein is exposed in an open cut on Dixie Creek a few hundred yards above the main Standard mine. It is a diorite dike, silicified and mineralized. Numerous spots of brownish-black tourmaline are present. The sulphides are pyrite, chalcopryite, and bornite. The dike strikes N.60° E. and dips steeply north. The dike has been followed by the miners for over 1500 feet on the surface. The wall rock of the diorite dike is greenstone. The walls are very indefinite and irregular.

"The Juniper vein is southeast of the Standard vein, in Ella Gulch, a small branch of Dixie Creek. The vein is opened along the strike by a tunnel 900 feet long. The vein strikes N. 75°-80° E. and dips about 80° S. It ranges in width from 3 inches to about 3 feet. Sulphides, chalcedony, and quartz are the common constituents. The sulphides are pyrite, chalcopryite, and arsenopyrite. Two spots of cobalt bloom were noticed. At the face the strike of this vein is N.80° E. and its dip 70° S. The vein swings and in one place strikes due east.

"In the Juniper vein, as in the Standard vein, several breccia zones cross or are crossed by the vein, with very little or no offset along either one. In the Juniper drift these zones strike N.5° E. to due north and dip about 75°-80° E. They contain from a few inches to several feet of gouge and breccia. The wall rock is all meta-andesite, some so much altered as to resemble hornfels. Much tourmaline is present in it.

"The sequence of mineralization has been tentatively worked out by combining the observations of Mr. Hewett and the writers as follows:

First the andesite was altered to 'hornfelslike' masses, the joints of which were locally coated with tourmaline. Calcite, the metallic minerals (beginning with pyrite and arsenopyrite), ferriferous dolomite, quartz, a second generation of calcite and pyrite, chalcedony, and marcasite, followed in order. Of these, the chalcedony and marcasite are probably supergene".

References: Lindgren 01:711
Swartley 14:197

Parks and Swartley 16:210
Gilluly, Reed, and Park 33:101 (quoted)

YANKEE BOY MINE (Gold)

Quartzburg District

Quartzburg Area

Owner: Mrs. Ester Berri, John Day, Oregon.

Lessees: Stevens Brothers, of Prairie City, Oregon.

Location: At an elevation of 4400 feet, 600 yards up the trail on the east side of Dixie Creek in sec.36, T.11 S., R.33 E.

Area: Four unpatented claims known as the Yankee Boy, Dunn, Bonanza, and Duchess of Prairies.

History: Discovered 40 years ago. Recent operations by Miller, Lewis and Wilson, lessees, started in August, 1937. The property is idle at present. It is planned to start work in 1941.

Development: Three levels on different veins. Six veins in all. The lowest level consists of 345 feet of crosscut; 195 feet in 2 drifts form the second level.

Equipment: The mill, which has a daily capacity of 4-5 tons, consists of the following: Chevrolet car engine, 3-foot diameter ball mill, 25-ton bin, 4x4 amalgamation plate, 50-mesh screen, tailings over corduroy and burlap to settling tub. Water is obtained by damming the lower tunnel and is sufficient to run the mill from 5 to 7 hours daily. Mill is located at lower tunnel level and the ore from the second level is passed down through 200 feet of 10-inch hydraulic pipe.

Geology: The vein system strikes approximately north and south, and dips 75° E. Veins vary in width from 1 to 6 inches and lie in a zone of broken diorite and argillite 2 to 4 feet wide. Stopping width is narrow. The present openings are in the oxidized zone and large amounts of limonite and hematite are present; sulfides are present, however. Pyrite is the predominant sulfide and is associated with minor amounts of chalcopyrite.

"The country rocks are chiefly altered diorite and andesite. The vein ...followed by the middle tunnel is about a foot wide and consists of a shear zone in the diorite, with stringers of quartz. It strikes N.20° E. and dips 85° E. Two fissures are exposed on the lower level. The one nearest the face, which has been followed for about 50 feet, strikes N.10° E. and dips 75° E. It consists of about 3 inches of gouge, quartz, and calcite, with pyrite, chalcopyrite, sphalerite, and galena. The diorite country rock is highly chloritic along the vein. The other fissure strikes about N.5° E. and dips 80° E. It is about 6 inches wide and contains the same minerals as the first but is much more brecciated."

Informants: Burton Miller, J.E.A. (10/14/38); Steven Brothers, H.K.L.(10/21/40)
Reference: Gilluly, Reed. and Park 33:96 (quoted)

SUSANVILLE AREA

Geography:

The Susanville area includes the drainage of the Middle Fork of the John Day River between Big Boulder and Sunshine Creeks on the east, and Cross Hollow and Big Creek on the west.

Gilluly, Reed, and Park (33:105-111) describe the area in some detail:

"The Susanville mining district is in Grant County about 18 miles down the Middle Fork of the John Day River from Austin. Most of the district is in the northwestern part of T.10 S., R.33 E., but it extends slightly into the adjoining townships on the north, northwest, and west. The mines are all on the north side of the river and are concentrated principally along Elk Creek, a small tributary that enters the river in sec.13, T.10 S., R.32 E. Deep Creek, the next tributary entering the river from the north below Elk Creek, may be considered the northwestern boundary of the area. The relief in the immediate district is probably less than 1000 feet, but the slopes in general are steep. The country is heavily wooded. The rainfall is moderate, but heavy snows are common in winter.

"Susanville postoffice is on Elk Creek about $1\frac{1}{2}$ miles above its mouth. The nearest railroad is the narrow-gauge Sumpter Valley Railway at Austin. In summer the road from Austin to Susanville is in fair condition. It is 3 miles by graded road from Austin to Batesville on the John Day Highway. Susanville may also be reached from the John Day Highway at Kimberley at the confluence of the North Fork and the main river by following up the North Fork.

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Geology:

"The country rock of most of the Susanville district is schist. Lindgren (Ol:pl.64) believed the schist to be Paleozoic, probably Carboniferous, but as no fossils have been found its age is uncertain. In the schist series, quartzite, greenstone, and slate occur in subordinate amounts. This series is the oldest formation in the district.

"The schists were intruded by bodies of basic and ultrabasic rocks, which originally were gabbros and peridotites. These bodies have been sheared and altered and are now for the most part serpentinous rocks, although some altered gabbro and peridotite occur.

"The district is bounded on the north and northeast by the edge of a large quartz diorite mass, which according to Lindgren's (Ol:pl.64) map extends eastward for at least 15 miles and forms the country rock of the Greenhorn mining district. The quartz diorite is a younger intrusion than the basic ones just mentioned. Aplite dikes cut the schists and the basic rocks. Presumably the dikes are related to the quartz diorite intrusion. The age assigned to the intrusion by Lindgren (Ol:596) is post-Jurassic and pre-Chico, and no reason was found to question this assignment.

"Here and there over the higher land in the district occur areas of the Columbia River lava, remnants of more or less continuous flows, which at one

time blanketed the whole district. Near the borders of the district the lava areas become larger - in fact, the district is almost encircled by lava flows. The older rocks are exposed as a result of the removal of the lava cover by the streams.

"The valley of the Middle Fork of the John Day River is floored with gravel of Quaternary age. The gravel extends continuously up Elk Creek as far as Susanville, and considerable areas are found even farther up the creek. . . .

"The dominant rock of the schist series is a gray actinolite-talc schist. A conspicuous feature of the rock, in addition to its soapy feel, is that it has developed a linear schistosity as well as a plane schistosity. Hand specimens show this feature by being striated parallel to the strike of the rocks. The schist is probably of sedimentary origin and contains carbonaceous material, and at some localities much graphite is developed along the shear surfaces. Black carbonaceous slate is included in the series in a few places.

"Near the Princess mine a fine-grained biotite schist occurs close to the quartz diorite contact. Cleavage surfaces of this rock are black with small bright flakes of biotite.

"No limestones were found in the schist series in the Susanville district, but a few thin beds of quartzite were observed. On the hill above the Skyscraper claim a conglomerate occurs in which are subangular chert pebbles as much as $1\frac{1}{2}$ inches across. Some greenstone, probably of pyroclastic origin, is also represented.

"Altered andesitic flows are locally interbedded in the schist series. They are especially conspicuous in the area around and between the Bull of the Woods and the Poorman properties. . . .

"Gabbro and associated peridotite and serpentine are not common in the district. Basic rocks are conspicuous, however, around and north of the Gem mine and between the Bull of the Woods and Side Issue mines. These rocks are in general highly sheared and altered, but in a few places original textures are preserved. Dark-green sheared serpentine is the chief representative and is well exposed along the road above the portal of the Bull of the Woods mine. In the immediate vicinity of the Gem mine the basic rock is altered peridotite. It contains tremolite, serpentine, pyroxene, magnetite, pyrrhotite, and a little relict olivine. . . .

"The quartz diorite that bounds the Susanville district on the north and east is but the border of a large mass that extends for a long distance toward the east. This rock is in places gneissic near the borders but is almost massive away from the contacts.

"The rock is light-colored, coarse or medium-grained, and granitic, with biotite, hornblende, quartz, and feldspar visible in hand specimens. Locally it is sheared, but nowhere to a degree comparable to that of the basic intrusive rocks.

"Microscopically the essential minerals are seen to be basic oligoclase, quartz, hornblende, biotite, and in some specimens a little augite. Apatite, zircon, titanite and magnetite occur as accessories.

"The numerous porphyry dikes that cut the older rocks in the district are probably related to this mass. The dikes are light colored and typically weather buff or pink. They are medium to fine grained and carry phenocrysts as large as 2mm. but averaging about 0.8mm. The phenocrysts are composed of quartz and oligoclase, in a groundmass made up of quartz, oligoclase, and muscovite. . . .

"Remnants of lava flows are scattered over the divide between Elk and Deep Creeks and occur more continuously on the divide between Elk Creek and the Middle Fork of the John Day River. The lavas are much younger than any of the previously described rocks and are probably to be correlated with the Miocene Columbia River lava. . . .

"The gravel along the streams and the slope wash and talus slopes of the hillsides represent the Quaternary period. . . .

"The schist enters the district from the west with an eastward strike. The general trend changes near the middle of the district, and the prevailing strikes in the eastern half are northeast, averaging approximately N.50°E. The dips are almost without exception steep to the south. A dip less than 50° is seldom observed, and 70° is common.

"Only at the Princess mine was an observation taken on the schist immediately contiguous to the quartz diorite contact. Here the foliation is parallel to the contact, about N.80° W., and to the foliation of the quartz diorite. However, in the vicinity of the Gem mine, only a short distance from the quartz diorite contact, the trend of the schist is nearly at right angles to the contact.

"The trends of the aplitic dikes are apparently parallel or nearly parallel to the trend of the country rock.

"The nearly flat-lying patches of Miocene (?) lava on the steeply dipping schist series indicate a profound unconformity. The fact that the contact between lava and pre-Tertiary rock is found at altitudes that differ considerably from place to place suggests that the surface on which the lava was poured out had considerable relief, probably comparable to that of the present day.

Ore Deposits: "Most of the ore deposits of the district occur in fissure veins, chiefly parallel to the schistosity of the country rock. In a few prospects certain zones in some of the aplite dikes have been worked and are reported to carry gold and silver. Some of the mineralization appears to have produced very irregular replacement masses.

"The deposits are all in the pre-Tertiary rocks. Most of them are in the schist series, but some are found in the basic rocks or at the contact of the basic rocks and the schist. No relation was found between the distribution of the ore deposits and the position of the main mass of the quartz diorite. However, many of the veins appear to be related to aplite dikes, which in turn are probably related to the quartz diorite. The common regional relation between the ore deposits of eastern Oregon and these quartz diorite masses makes this interpretation more reasonable.

"The dominant gangue mineral of the veins is quartz. Ankerite and fuchsite are conspicuous in some of the veins. The metallic minerals determined

from the study of polished sections are pyrite, marcasite, arsenopyrite, chalcopyrite, pyrrhotite, sphalerite, galena, stibnite, tetrahedrite-tennantite, and chalcocite.

"There was probably considerable overlap in the periods of deposition. Individual grains of pyrite are shattered and corroded, in places almost completely destroyed. Many of the fractures through this pyrite contain arsenopyrite, chalcopyrite, sphalerite, and gangue. That arsenopyrite was deposited later than part of the pyrite is further substantiated by the fact that there are numerous rounded fragments of pyrite isolated in the arsenopyrite.

"The arsenopyrite in turn is fractured. These fractures commonly contain some chalcopyrite and sphalerite. Chalcopyrite is especially common but also occurs in angular spots scattered through the arsenopyrite. These spots finger off or pinch out gradually, as if the copper mineral had worked in along grain boundaries or minute cracks. A few small rounded pieces of arsenopyrite are entirely surrounded by chalcopyrite and sphalerite.

"The paragenesis of the chalcopyrite, pyrrhotite, and sphalerite is confused, probably because of overlap. The sphalerite contains a great number of small spots of chalcopyrite, pyrrhotite, and locally galena. In one specimen sphalerite is distinctly veined by pyrrhotite; in others sphalerite appears to penetrate and replace pyrrhotite along grain boundaries. Chalcopyrite is common in fractures and veinlets, through and around grains of pyrrhotite. In some places the chalcopyrite is veined by sphalerite. From this evidence it is thought that the pyrrhotite may be partly earlier than the chalcopyrite and the sphalerite, although in part, at least, they are contemporaneous.

"Galena is considered younger than any of the previously described minerals except where the galena occurs in small spots in the sphalerite. Here these two minerals are probably contemporaneous. Considerable galena also occurs in the sphalerite in fractures and around holes; some is present in fractures through the pyrite. In many of the specimens rounded fragments of sphalerite are isolated in the galena.

"There appear to have been two main periods in which pyrite was deposited. The first period began prior to and probably lasted during the deposition of the arsenopyrite. The second was at least later than the chalcopyrite and sphalerite. No pyrite has been observed cutting galena. Galena is not a very common constituent of the specimens, and such a relation might easily be missed. It is entirely possible that in the line diagram the period for deposition of pyrite should be represented as extending past the galena period.

"It is also possible that there was one long period of deposition of pyrite instead of the two given. There is, however, no direct evidence to support this possibility.

"Stibnite has been omitted from the discussion of paragenesis because it was not seen in the same specimen with any other metallic minerals. It occurs in small radiating bunches of fine fibers or in small colloform masses. The material in which it was seen is vuggy and porous. The holes are lined with fine drusy quartz. Chalcedony is present in alternating layers with the stibnite. Tetrahedrite-tennantite was observed in only one specimen, from the Ophir mine, in which it replaces pyrite.

"Later than any of the sulphides or metallic minerals is part of the gangue. Many of the specimens have been shattered and the fragments recemented by gangue. Gangue minerals have been observed transecting all the metallic constituents.

"There is no evidence of important supergene enrichment, although the few minor fissures and spots of chalcocite and marcasite were probably deposited by supergene waters."

History: The early history of the area was largely the history of the Susanville placers (which see). Later, lode mines, notably the Badger, became active. When the near-surface oxidized ores were exhausted, properties were closed down, since the sulphide ores would not yield a profitable recovery by amalgamation, plus mechanical concentration. In recent years dredging on the Middle Fork of the John Day River by the Timms Gold Dredging Company has added substantially to the gold production of Grant County.

BADGER GROUP (Gold)

Susanville Area

Owner: Bradley Mining Co., 425 Crocker Building, San Francisco, California. Robert E. Baker, resident superintendent.

Location: This group is located on the south side of Elk Creek in sec. 8, T.10 S., R. 33 E.W.M., about 2 miles above the junction of Elk Creek and the Middle Fork of the John Day River.

Area: Seven patented claims known as the Steamboat, King of the Hills, Hughes, Bear, Badger, Bishop and Great Eastern.

Development: Twelve hundred feet of crosscut on the Badger claim has been reopened for examination. Robert E. Baker, 1/28/41.

According to Oscar H. Hershey's report on the Badger mine: "The Badger vein was discovered about 1878 by, it is thought, Charley Smith, who drove a 150-foot crosscut tunnel which cut the so-called secondary vein at the 50-foot level. About 1883 it came into the possession, by purchase, of John Hughes, who relocated it on Jan. 1st, 1897, the foundation of the present title. While it was in his possession, Mr. Hughes developed it to a depth of about 90 feet, including drifts on a vein aggregating 265 feet. In surface cuts on the discovery vein, northeast of the collar of the present main shaft, he had a shoot of ore in some of which he could see free gold and some of this ore he worked in an arrastre, getting fair but not high returns per ton. Much of his driving was done easterly on the 50-foot level with the object of opening the ore shoot he had on the discovery vein on the surface, but he found nothing, because, as subsequently developed, he was not driving on the discovery vein but on the spur which is a part of what is now known as the secondary vein. The ore shoot that he had on the discovery vein at the surface is evidently untouched underground and remains a possible asset of the mine when it is practical to work lower grade ore. The Badger vein joins the main vein which at the surface is about the collar of the shaft.

"On the vein west from the present shaft, Hughes had ore which he thought

carried from \$35 to \$140 per ton. About 1898 he sold the mine, along with the McQuade, King of the Hills and Steamboat mines to George DeWitt and associates for \$12,000 and in addition got about \$3,000 as a 15% royalty on ore shipped while payments were pending. In about 1899 the purchasers organized the Badger Gold Mining and Milling Company.

"The Meyers and Bennison report contains the following information: The ore carried gold and silver, partly in sulphides. The high-grade shipping ore ran from \$150 to \$300 per ton. This streak of ore was from 6 inches to 2 feet wide. The mine had an inclined shaft on the vein 450 feet deep and 6 levels. The 50-foot level was opened 307 feet, the vein was from 3 to 5 feet wide, and all the ore went to the mill, except 10 tons which was sorted and shipped to the smelter. The 100-foot level was opened 268 feet; considerable high grade shipping ore was taken from this level and the balance sent to the mill. On the 150-foot level, the drifts aggregated 191 feet. It says the 250 level was opened 299 feet, and yielded considerable high-grade ore; also that the ground from the 250-foot level to the surface had been practically all stoped out as far as developed and that smelter returns show a net production from this ore, after freight and treatment charges, of \$109,000.17. (At that time the terminus of the Sumpter Valley Railroad was 30 miles away and hauling to it may have cost \$20.00/ton.) The 350-foot level had been opened 269 feet and no stoping was done. The 450-foot level had 35 feet of drifts in ore. The ore was left in place between the 250-foot and 450-foot levels (except what was removed in driving) and was described as being much higher in grade than the ore extracted above the 250-foot level. There were 10,000 tons of second-grade ore on the dump and about 2,000 tons of similar ore used as filling in the mine, making 12,000 tons the average value of which was placed at \$25 per ton. The equipment consisted of a 10-stamp gold mill, cook and boarding house, office, bunkhouses, ore houses, good hoisting plant and a 40 h.p. engine. This report probably describes the condition of the property at about the time E. P. Kennedy became superintendent. I have no reason to think that the figure given as the production of the mine above the 250-foot level is materially incorrect. A bundle of smelter receipts on ore and concentrates and bullion deposited running from Jan. 18th, 1899 to October 25, 1901, that has passed through my hands, adds up to about \$95,000 and doubtless there were shipments before 1899.

"According to the superintendent's report for the period from March to Dec. 31st, 1902, \$76,952.48 was spent and was charged to the following accounts:

Mill equipment	\$16,346.76
Milling	3,710.30
Mine equipment	2,468.90
Mining	32,222.04
Bullion	6,982.30
Stable	7,313.12
Mining claims	1,656.45
General expense	5,666.72
Boarding house	585.89

"As development work, the main shaft was sunk to the 500-foot level, 548 $\frac{1}{2}$ feet of drifts were driven on the 300, 400, and 500 foot levels, 199 feet of cross-cuts run, and the mill tunnel was driven 713 $\frac{1}{2}$ feet; 2,605 tons of ore were stoped from the mine and 5,142 tons were trammed from the dump. The mill was completed on July 6th and ran most of the time up to December. It crushed 7878 tons of ore of an average value of \$8.92 per ton, making 684.11 tons of concentrate averaging \$60.58 per ton. Thus the ore carried 8-6/10% of recoverable concentrate

and the extraction was 58-9/10% of the value. The value of the ore milled was \$70,328.78, the smelter values from which were \$42,778.80. Some of the concentrates were hauled to Whitney at a cost of \$13.75 per ton and some were hauled to Pendleton at a cost of \$18.19 per ton. The net value of the concentrates after deducting the cost of transportation and treatment was \$22,550.45. Of the ore mined, 70 tons from above the 250-foot level proved much below the average, 1099.6 tons from the 350 West stope were far above the average, 174.4 tons from the 350 East stope were about the average ore, while 528 tons from the 500-foot level averaged less than \$3.00 per ton.

"The superintendent's report for the period from March 1st, 1902, to December 31, 1903, contains probably the best evidence of what the Badger ore has been capable of under such conditions as existed before the extension of the Sumpter Valley Railroad to Austin. The development work consisted of 716 feet of drifts, 471 feet of raises, 75 feet of crosscuts, 294 feet of shafts, 1137 feet of the Mill Tunnel, 287½ feet of the "500 Crosscut", at a total expense (including the money spent on the McQuade Mine) of \$38,699.29. 8,809.254 tons of ore were stoped from the mine and 5792 tons were trammed from the dump at a total cost of \$31,415.13. Of the milling ore the 500 stope yielded 1933 tons, assaying \$5.48; 400 stope, 2967.1 tons, assaying \$7.53; 300 West stope, 1099.6 tons, assaying \$10.88; 300 East stope, 956.8 tons, assaying \$14.33; 500, 400, and 300 East stopes, 1475 tons, assaying \$10.64; above 250-foot level, 136.5 tons, assaying \$4.90; dump 5792 tons, assaying \$8.50, giving a total value of \$122,113.68.

"The shipping ore amounted to 241.254 tons assaying 2.017 oz. Au and 131.44 oz. Ag, a total value of \$101.06 per ton.

"The hoist was removed from the collar of the shaft and set up underground so as to sink below the 500 foot level. This hoist and the pump were operated by compressed air. The pump handled the small amount of water by pumping between shifts.

"The cost of milling 14,360 tons of ore was \$6,988.29 or \$4.86 per ton. This, however, included mill supplies on hand sufficient for a season's run. About 70 tons was the average milled in 24 hours. The concentrate made amounted to 1294.613 tons of a gross value of \$73,992.10, showing concentrates recovered to be 11% of tonnage milled and containing 60.5% of the assay value of the ore milled. The richest concentrates were the coarsest, about ½-inch in size, and the value decreased with the size.

"The bullion expense at Susanville amounted to \$24,023.03 of which \$21,711.11 was for hauling. 1,306.657 tons were hauled to Whitney at a cost per ton of \$13.95 and 220.150 tons were hauled to Pendleton at a cost of \$17.57. Had the railroad been extended to Susanville there should have been a saving on hauling of at least \$12 per ton or about \$18,000.

"The superintendent's statement of receipts and disbursements from March 1, 1902 to December 31, 1903, shows that there was received from concentrates and shipping ore \$106,812.27. Against this he has charged to capital account and improvements, \$45,478.01 and to operating expenses \$139,690.40. Apparently the latter sum does not include all of the development expense but only such portion as was necessary to open up the ore to be stoped. In short, the ore cost \$32,878.13 more than it returned. Had the railroad been extended to Susanville, the loss might have been reduced to \$14,878.13. Perhaps a better mill might have given a higher percentage of saving and perhaps also part of the apparent loss went into the development of ore to be mined later. In short, it looks

to me as though between March 1st, 1902 and December 31, 1903 no reasonably expected improvement in conditions could have made the Badger mine a paying proposition.

"The superintendent's report for 1904 has not come into my hands and this is to be regretted as this must have been one of the best years of the mine's history. I have receipts from the Tacoma Smelting Company showing net returns of \$13,081.71 but this was apparently on ore shipped or at least mined the preceding year. It seems that there was some development work done below the 500-foot level, which opened up the ore shoot, and that stoping of ore was continued above the 500-foot level.

"In 1905 the receipts were \$18,025.96 and the expenses were \$29,745.50.

"The development consisted of 97 feet of shaft, 100 feet of raise, 900 feet station and ore pocket, 344 feet of drifts on the 900-foot level and a 94-foot crosscut on the same level. The stoping of 1507 tons cost \$2.36 per ton, a total of \$3,569.48. The milling of 1498 tons cost \$.987 per ton or \$1,479.32.

"The ore yielded about 15.6% concentrate with an extraction of 75% of the gold and 75% of the silver. The gross assay value of the ore was \$9.34 per ton.

"In October 1905, 521 tons were milled from the 700 stope and averaged 120 oz. Au and 7.28 oz. Ag per ton. In November, 552 tons were milled from the 700 stope and 325 tons from above the 500-foot level; the average content was .143 oz. Au and 5.158 oz. Ag per ton. The value of the latter was about \$5.53 per ton and the preceding month's ore carried \$7.77 per ton. The milling of such ore below the 500-foot level suggests that the grade of ore had become poorer below that level. At any rate, the ore was not paying the expense of working it, and the mine was closed down about November 1st and the mill about November 30th.

"The ore in sight in the mine is apparently as follows - above the 500-foot level, the unstopped ground consists mainly of a considerable block of oxidized ore which is said to be very amenable to cyanide treatment. It is developed by the extreme westerly workings near the surface and is described as carrying \$8 to \$12 per ton. The main body of the ore in reserve is in that portion of the mine which is now under water, namely, below the 500-foot level.

"It is stated that the face of the 900-foot level showed some high-grade ore, the drift having just reached the beginning of the ore shoot. The mine makes only a small amount of water and could easily be unwatered with compressed air by relaying a pipe line from the compressor to the mine". 1/

"The mine is owned by the Susanville Mines Co. Parks and Swartley say: This vein was discovered in the late sixties, and in the early seventies free gold was extracted in an arrastre from the decomposed croppings, which yielded about \$25 per ton. Later on a ten stamp mill, with concentrators, was built, but there was not a high percentage of extraction.

"As a result of litigation with the Stockton Mining Co. the mine was shut

down in 1905. There was some activity at the property in 1922, but none since. The mine has produced in the past considerable gold, silver, lead and zinc.

"The mine was originally opened by a shaft that was sunk 900 feet below the collar. Later a 1,600-foot crosscut was driven from a point about 30 feet above Elk Creek. This level is about 500 feet below the shaft collar, or 400 feet above the bottom of the shaft. The shaft has caved above the crosscut level and is inaccessible. The crosscut, however, is open, furnishing access to about 3,000 feet of drifts and several winzes and raises. The workings are flooded nearly to the main crosscut level.

"Geology: The predominant country rock is slate, but shale, schist, and quartzite are also present. The strikes are uniformly east and the dips range between 55° and 60° S.

"Gouge and breccia along the planes of schistosity suggest strike faulting. This appears to be common throughout the district. The southside appears to be the downthrown side.

"The veins conform to the strike and dip of the country rock. At least two veins have been stoped. These veins are about 6 feet apart and range in width from 1 foot to 20 feet. Fragments of wall rock are contained in the veins. In some places the veins appear to be at least in part replacement bodies in that "ghosts" of wall rock are present.

"The vein material is predominantly quartz. Much ankerite is also present. The most common sulphide is pyrite. Locally galena, sphalerite, or arsenopyrite may predominate." 2/

References: 1/ Oscar H. Hershey (private report May 26, 1908)
(Courtesy of Bradley Mining Co.)
2/ Gilluly, Reed, and Park 33:111
Lindgren 10:706
Swartley 14:170
Parks and Swartley 16:19

BELLE OF THE HILLS GROUP (Gold)

Susanville Area

Owner: Arthur J. Johnson Estate and Gertie O'Rourke, Susanville, Oregon.

Location: Lies directly west of the Badger on the south side of Elk Creek in T.10 S., R.33 E.W.M.

Area: Three unpatented claims called the Belle of the Woods, Victor, and Hidden Treasure.

Development: Two tunnels, connected by a raise. (Lower tunnel 600 feet long, upper tunnel 300 feet long). This work is open.

"The Belle of the Hills property, owned by Norman Johnson, of Susanville, is composed of three claims that lie directly west of the Badger Mine.

"The mine consists of two levels, the upper about 55 feet above the lower. The upper level is opened by an adit about 130 feet long and has about 300 feet of drift. The lower adit is 380 feet long. There is about 370 feet of drift

in the lower level. The two levels are connected by a 60-foot incline. On the hillside above the mine are several small shafts and open cuts. No production has been reported.

"The country rock is talc schist and slate. The strike is in general east, and the average dip is about 70° S. The workings cut several small seams of quartz, but nearly all the work has been confined to one vein, which strikes $N.70^{\circ}$ E. and dips 60° - 70° S. The vein ranges from 6 inches to 1 foot in width and contains considerable quartz and pyrite. According to Mr. Johnson, some of the quartz stringers encountered in the open cuts show free gold in the pan".

Informant: Gertie O'Rourke, H.K.L. (1/28/41)

Reference: Gilluly, Reed, and Park 33:115. (quoted)

BLACK HAWK MINE (Side Issue) (Gold)

Susanville Area

Owner: Mose Fuchs, Baker, Oregon, and Mrs. McEwen.

Operator: Robert Daugherty, Susanville, Oregon.

Location: The Black Hawk Mine lies east of the Bull of the Woods on the southeast side of Elk Creek.

Area: Two full claims, the Black Hawk and the Side Issue, and one fractional claim, the More or Less. These claims are patented.

History: Locators of claims unknown. Thomas McEwen completed enough work to patent the claims (the Black Hawk, Side Issue, and More or Less) in 1903. In 1905, Robert Daugherty and four associates sunk a 100-foot shaft on the Side Issue claim. They mined everything above the water level. This old shaft is caved. In 1926, Andy Porter started sinking the shaft on the Black Hawk claim. He continued until 1930. During this time he sank the shaft about 130 feet and sorted 100 sacks of shipping ore, which were said to have averaged \$150. This ore was stolen so that no assay was made. The mine lay idle from 1930 until 1939 when Robert Daugherty took a lease, which he still holds.

Development: The development work at the Black Hawk mine consists of a 130-foot incline shaft and 105 feet of tunnel.

Equipment: Single stage 10"x10" horizontal-type compressor manufactured by The Union Works. (No power for compressor). Hoist powered by a four cylinder automobile motor. 150 feet of cable on hoist. Two sinking buckets made from 50 gallon gasoline barrels. Two 18-cu.ft. (need a little repair work). One 14-cu.ft. car. 400 feet 12-pound rails, 2'x5' air receiver. Small blacksmith shop for sharpening hand steel. Small drill press.

General Description: The elevation is about 1500 feet and the mountains are moderately steep. The claims are heavily wooded. Rainfall is moderate, but the snowfall is heavy in winter. The mine is accessible during the summer and fall by means of a dirt road.

Geology: The country rock is talc schist. The vein consists of a quartz stringer and gouge varying in width from 4" to 20". Pyrite, galena and sphalerite present in small amounts. The vein strikes $N.65^{\circ}$ and dips 40° S. Near the

top of the shaft the vein dips 60° S. and flattens to a 40° in the drift at the bottom of the shaft.

"The Blackhawk property, like the Badger, is owned by the Susanville Mines Co. It lies east of the Bull of the Woods, on the southeast side of Elk Creek. The property is opened by a shaft inclined at 60°. The shaft is reported to be 150 feet deep, but it is filled with water within about 40 feet of the surface.

"The country rock is talc schist. The vein consists of a 6-inch stringer of quartz and gouge with some pyrite, galena, and sphalerite. The vein strikes N.70° E. and dips 60° S.

"The old mine known as the Side Issue is on the Blackhawk property. All the workings are inaccessible. Outcrops of talc schist and serpentine were seen near the shaft."

Informant: H.K.L. (7/30/40)

Reference: Gilluly, Reed and Park 33:116 (quoted).

BRADLEY MINING COMPANY

Susanville Area

The Bradley Mining Company, 425 Crocker Building, San Francisco, California, is reopening the old workings of the Badger, Golden Gate and Homestake Groups for examination. (See descriptions of properties under above names).

BUCK GULCH (Placer)

Susanville Area

Owner: Charles West, Galena, Oregon.

"The Buck Gulch placer is about 3 miles north of Galena and about 1000 feet above the river. This is the small gulch in which coarse nuggets are occasionally found. One which attracted considerable attention was found June 19, 1913, by George Armstrong, the owner of the property. It weighed 80.4 ounces and was valued at \$1415.00".

Informant: Gertie O'Rourke, Susanville, Oregon; H.K.L. (10/30/40)

Reference: Parks and Swartley 16:45 (quoted).

BULL OF THE WOODS CLAIM (Gold) (See Homestake Group)

Susanville Area

CHATTANOOGA CLAIM (Gold)

Susanville Area

"The Chattanooga property consists of one patented claim lying southwest of the Rescue group. It is owned by B. F. Hurt of Susanville. The property is opened by a vertical shaft, filled with water but reported to be 210 feet deep. A little ore has been shipped in the past.

"The country rock is talc schist. The vein strikes N.65° E. and dips 60° E. The predominant gangue mineral is quartz, but ankerite, mariposite, and sericite are present. Massive sulphides were found on the dump and include pyrite, chalcopyrite, sphalerite, galena, and arsenopyrite".

References: Swartley 14:171

Parks and Swartley 16:165

Gilluly, Reed, and Park 33:113 (quoted).

COMPTON MINE (Gold)

Susanville Area

Owner: Curley Buys, Payette, Idaho.

Assessment work was done in 1940.

"This mine is not far from the North Gem Mine, in sec.5, T.10 S., R.33 E. The vein is in slate and serpentine. An incline 140 feet deep has been sunk on a 4-foot vein of ore, which averages about \$15. The shoot is said to be at least 125 feet long. Rich ore is found on the walls from 6 inches to a foot wide. The ore contains some galena and a trace of copper in massive arsenical iron and zinc sulphides. Only the assessment work is done each year".

Informant: Gertie O'Rourke, Susanville, Oregon; H.K.L. (10/30/40)

Reference: Parks and Swartley 16:68 (quoted).

DAISY CLAIM (Gold)

Susanville Area

"The Daisy Claim, owned by B. F. Hurt of Susanville, lies just south of the Rescue group.

"The country rock is talc schist. Two small open cuts expose a small vein, which strikes N.20° E. and dips about 65° E. The gangue is rusty quartz. Small amounts of sulphides, chiefly pyrrhotite, pyrite, and chalcopryite, occur in the quartz. Mr. Hurt says that the value is mostly in free gold."

Reference: Gilluly, Reed and Park 33:113, 114 (quoted)

GEM MINE (NORTH GEM MINE) (Gold)

Susanville Area

Owner: Mrs. Lean B. Dunstan, Susanville, Oregon; Mrs. G. S. L. Smith, London, England.

Location: The Gem Mine lies north of Susanville between the forks of Elk Creek in sec.5, T.10 S., R.33 E.

Area: Two patented claims and a 160-acre homestead.

Development: The vein is opened by an inclined shaft, which is now filled with water within 50 feet of the surface. The shaft is reported to be 350 feet deep and to have four levels turned from it.

"Seventy-five to a hundred tons have been milled elsewhere and a few tons shipped crude The property was closed down in 1910, but in September 1916 a carload of crude ore was sorted and shipped to smelters." 1/

"According to a report by Carl Anderson, a mining engineer of Portland, 13 tons of ore has been shipped to smelters. Some development work was done in 1922.

"Geology: The country rock is talc schist and altered peridotite. At the surface the peridotite marks the footwall and the schist the hanging wall of the vein. At the water level in the shaft both walls are schist. Serpentine is reported below the water level. The contact of the peridotite and the

schist was not traced, but the strike of the schist is N.45° E. and the dip 62° SE at the shaft collar.

"The vein, which is about 3 feet thick, corresponds in attitude to the strike and dip of the schist. In a small gulch just below the Gem shaft another vein, which strikes N.40° E. and dips 60° SE, crops out. If these strikes and dips persist these veins intersect north of the shaft.

"The vein consists of quartz with subordinate ankerite. It carries some free-milling gold. Chalcopyrite, pyrite, and pyrrhotite were seen on the dump." 2/

The mine is idle at present. (J.H.Dunstan, 2/28/41).

References: 1/ Parks and Swartley 16:164

2/ Gilluly, Reed, and Park 33:112

GOLD BUG (Gold)

Susanville Area

Owner: J. H. Dunstan, Jr., Susanville, Oregon.

"The Gold Bug prospect, owned by Messrs. Leavy and Dunstan, of Susanville, is near the crest of the ridge about a mile northeast of Susanville. The workings are inaccessible. According to Charles Ray, the shaft is about 400 feet deep. The mine has been abandoned for years, and no production was reported.

"The country rock is talc schist that strikes N.50° E. and dips 70° SE. The poor outcrops near the shaft collar indicate that the vein conforms to the strike and dip of the schist. Some carbonate was seen in the iron-stained quartz on the dump".

Reference: Gilluly, Reed, and Park 33:115-116.

GOLDEN GATE GROUP (Gold)

Susanville Area

Owner: Bradley Mining Co., 425 Crocker Building, San Francisco, California. Robert E. Baker, resident superintendent.

Location: The claims lie east of the Badger Mine, on the northwest of Elk Creek in secs.5 and 6, T.10 S., R.33 E.W.M.

Area: Seven patented claims known as the Ruth, Blue Jay, Beaver, Alta, Poorman, St.Lawrence, and Ruby.

Development: About 450 feet of the Golden Gate tunnel, which originates on the Poorman claim and runs N.18° W., has been reopened to date. In addition sixty odd trenches have been dug on the claims.

According to Oscar H. Hershey's report on the mine: "The property consists of the Blue Jay, Beaver, Alta, Poorman, Ruth, St.Lawrence and Ruby claims. The company was organized I believe in 1901. In April 18, 1907 the Susanville Commercial Company owned all of its stock.

"Only the main Beaver vein seems promising. Here an orebody was worked by a man named F. Cabel before 1870. The orebody was approximately 70 feet long, 2½ feet thick and 100 feet deep. Later a tunnel 833 feet long was driven from near the Creek level. At 450 feet it cut the right vein but this fact

has only recently been known and no driving was done on it. At 650 feet it cut another strong vein or zone of shearing. Thence it runs 180 feet into barren ground ending almost under the outcrop of the surface orebody. E. P. Kennedy for the Golden Gate Company sank a shaft along the southwestern edge of the old stopes to a depth of 130 feet. Being on the "footwall streak" he crosscut, I am told, 25 feet easterly and found nothing encouraging. The Sloan tunnel¹ is about 170 feet down on the vein from the bottom of the old stopes.

"The Blue Jay claim which was located by H. W. Sloan April 9, 1894, has two prospects, one near the eastern and the other near the northwestern border of the felsite.

"The tunnel that developed the Alta vein is caved. It is probable that the Alta vein is cut by the Sloan tunnel between the mouth and the Beaver vein, but if so, it does not appear promising.

"The Poorman claim was located by Charles Smith April 28, 1879. A small shoot of free-gold ore, apparently 15 or 20 feet long, 25 feet deep and several feet thick was mined and worked in an arrastre. I don't doubt that at greater depth small bodies of pay ore occur, but this prospect does not appear of much value.

"I don't think there is a prospect of any kind on the Ruth claim, but on the St. Lawrence or Ruby claims there is a shaft on the dump of which there is altered serpentine, some of which, it is said, prospects well in free gold. I don't know much about this prospect and cannot judge of its value.

"In short, it is my opinion that the future of the Golden Gate group hinges upon what the Kinnear brothers (leasers on the Beaver claim) develop on the Beaver vein. I even doubt the existence of a continuous shoot of ore, but expect a series of lenses distributed along a line which may have a pitch like an ordinary ore shoot. I consider the chances rather good of the Kinnear brothers finding sufficient ore within the limit of their present lease to well repay them for their work". 1/

*

"The Poorman group or Dougherty property consists of seven patented claims, all owned by Robert Dougherty, of Susanville. The claims lie east of the Badger mine, on the north side of Elk Creek. There are numerous old adits and shafts on the hillside, most of which are caved and inaccessible. About 300 feet of drift is open. Mr. Dougherty reports that there has been a small production of free-milling gold.

"The country rock is talc schist with some slate. The schist series is cut here by an aplite dike about 50 feet thick. The dike appears to be vertical and strikes a little west of north. A vertical zone, striking N.60° E., in the aplite is now being worked.

"The veins are all small stringers, but they are reported to be rich. The gangue minerals are predominantly quartz and ankerite. The sulphides seen include sphalerite, pyrite, galena, chalcopyrite, and stibnite". 2/

References: 1/ Oscar H. Hershey (private report May 28, 1908)
(Courtesy of Bradley Mining Company)
2/ Gilluly, Reed and Park 33:114, 115

HOMESTAKE GROUP (Gold)

Susanville Area

Owner: Bradley Mining Co., 425 Crocker Building, San Francisco, California. Robert E. Baker, resident superintendent.

Location: On the northern side of Elk Creek in secs. 7 and 8, T.10 S., R.33 E.W.M.

Area: Five patented claims known as the Lone Star, Mocking Bird, Plowman, Bull of the Woods, and Ethel.

Development: About 500 feet of underground workings on the Bull of the Woods claim have been reopened to date for examination. In the upper workings the vein strikes N.40° E. and dips 60° E. The vein is narrow and not continuous. In the last 30 feet of drift the average width of vein is one foot and assays about 0.3 ounces in gold and one ounce in silver. The vein is not visible in the section of lower drift now open.

A comprehensive surface trenching program, which will be continued in the spring, has been started. (Informant: Robert E. Baker, 1/28/40).

According to Oscar H. Hershey's report on the Homestake Gold Mining Company: "This company was organized in 1901 to operate the Bull of the Woods, Mocking Bird, Plowman, and Lone Star quartz claims and 20 acres of placer ground which I presume is the Ethel claim. Extravagant statements as to the contents of the ores were made in a prospectus issued by the Company and subsequent developments show that they are not worthy of a place in the history of the property. In 1902, W. Gregg, Jr., and F. W. Bradley, after an examination of the Bull of the Woods Mine, purchased much of the stock of the company. On April 18th, 1907, 98% of the stock was held by the Susanville Commercial Company.

"The Plowman, Lone Star and Ethel claims did not appear to me to present anything definite enough to be worth description.

"The Mocking Bird claim (formerly the North Star) was prospected over 35 years ago. John Hughes, an old resident, said that an 80-foot shaft was sunk and \$21.00 per ton in free gold was taken from it. It became base at the bottom and was not followed deeper. Two tunnels were run subsequently. The upper tunnel was over 100 feet long and yielded ore that milled \$10 or \$12 per ton in free gold. The ore shoot was over 50 feet long and probably averaged 18 inches wide. It was mined out above this tunnel and then the lower tunnel was driven, but developed only stringers. It may be that the lower tunnel failed to reach the place where the ore shoot, presuming that it has the usual north-eastward pitch, is due. The present title to the claim dates from a location on Aug. 30th, 1883, by Sampson Roy and J. A. Whitman.

"The Bull of the Woods claim was first located very early in the history of the camp by a man named Chrisup, and about 1885 John Hughes became an owner with Chrisup. About 1894, Hughes sold his interest to H. W. Sloan, who re-located the claim on Jan. 1, 1896, the foundation of the present title. About 1897 two pocket hunters named Clark found the shoot of ore which has since been worked down to a depth of 200 feet. At that time Sloan had the sole interest in it, but he bonded it to DeWitt and associates and in 1901 it came into the possession of the present company. Previous to this a tunnel had been driven 100 feet on the vein and some ore stoped above it. At one place on the surface

of the claim but some distance from where the shoot exposed by the tunnel reaches the surface, two shafts about 30 feet deep developed a shoot of ore of which not much is known. This shoot, it seems evident, has not been opened by any lower workings.

"At another place on the surface there is an old shaft which is said to be 70 feet deep, though partly caved. Ore from this shaft is said to have milled over \$6 per ton in free gold. I am told that this shaft is directly over the ore which is exposed near the end of the long Bull of the Woods tunnel. All the surface workings are either caved or unsafe to enter without new timbering. The ore referred to as being near the end of the long tunnel was discovered just before the mine ceased operation in 1905. It was subsequently better developed by mistake under a lease. It now appears as a shoot exposed about 70 feet long with one end certainly not in sight. The vein is well defined and carries sulphides including much blende. Possibly a width three to four feet may be ore. Wm. Kinnear says that Kennedy told him that the ore averages \$10 per ton and would merely pay the expense of working. I think it probable that a thorough investigation would reveal here a shoot of ore comparable with that worked by the Homestake Company and which perhaps could be profitably worked if Susanville had railroad connection.

"I like the relation between the little chimneys of porphyry and the ore shoots. It makes the shoots short, but it also indicates that they may go deep. The acid porphyry is seen underground close to the ore. Although I am usually prejudiced against mines in serpentine, I am rather favorably impressed by the Bull of the Woods claim". 1/

*

"The Bull of the Woods mine is owned by the Susanville Mines Co., the same company that owns the Badger. The workings are just east of the Badger mine but are on the north side of Elk Creek.

"The mine has been opened by two adits and a vertical shaft that connects the adits. The shaft is about 100 feet from the portal of the upper adit. The upper level is caved beyond the shaft but is reported to have been 1500 feet long. The lower level consists of about 220 feet of drifting. A small production was reported from the mine in 1905.

"The country rock is serpentine and talc schist. A little aplite and greenstone were also seen. The country rock is broken and shattered, and alteration has converted much of it to sericite and clay.

"The vein is not visible in the upper workings, but it is reported to strike slightly east of north and to dip steeply east. No definite vein was followed in the lower level. The work has been done in the shattered altered area containing quartz, ankerite, sericite, serpentine, limonite, hematite, and some pyrite."

"The Mocking Bird property is on the north side of Elk Creek just across from the Badger. It is controlled by the same company that owns the Badger. The workings consist of a small open cut and a tunnel that is now inaccessible.

"The talc schist country rock is cut by a large aplite dike. The vein, consisting of 6 inches of quartz and gouge with considerable jarosite, follows close to the schist-aplite contact but is confined to the schist. The strike of the vein is N.10° E. and the dip is 70° SE. On the dump were found pyrite,

sphalerite, chalcopyrite, pyrrhotite, and a little galena". 2/

References: 1/ Oscar H. Hershey, (private report May 26, 1908)
(Courtesy of Bradley Mining Company)
2/ Gilluly, Reed, and Park 33:113,116
Parks and Swartley 16:124

MOCKING BIRD CLAIM (Gold) Susanville Area
(See Homestake Group)

NORTH GEM MINE (Gold) Susanville Area
(See Gem Mine)
References: Lindgren 01:707
Swartley 14:171
Parks and Swartley 16:164

NELSON GROUP (Gold) Susanville Area

Owner: Guy Nelson, Susanville, Oregon

"Guy Nelson, of Susanville, owns some claims at the junction of Elk Creek and the Middle Fork of the John Day River. At the time of the writers' visit a small inclined shaft, reported to be 25 feet deep, was filled with water. The country rock is talc schist. The schist, which contains seams of pyrite and marcasite both parallel to and cutting the schistosity, is reported to carry gold".

Reference: Gilluly, Reed, and Park 33:117 (quoted)

OPHIR MINE (Gold) Susanville Area

Owner: Gertie O'Rourke, Susanville, Oregon.

Development: Work consists of 340 feet of tunnel. Two men are carrying on surface and underground development work at the present time. (Gertie O'Rourke, 10/30/40).

"The Ophir mine lies south of the Badger shaft on the slope toward the Middle Fork of the John Day River. The property consists of one claim which is developed by a shaft and several adits. Of these only one small adit, 290 feet long, is accessible. A little ore was shipped to the Tacoma smelter in 1908.

"The country rock is talc schist and slate. The strike is N.55° E. and the dip 55° SE. Several small quartz and carbonate stringers parallel the schistosity. Pyrite, chalcopyrite, and tetrahedrite-tennantite were the metallic minerals observed. Some aplite occurs in the accessible adit".

References: Swartley 14:171
Parks and Swartley 16:168
Gilluly, Reed, and Park 33:116 (quoted).

POORMAN GROUP (Gold) Susanville Area
(See Golden Gate Group)

PRINCESS MINE, INC. (Gold)

Susanville Area

Owner: Princess Mine, Inc. W. L. Merritt, president and treasurer;
M. C. Merritt, secretary, Susanville, Oregon.

Location: On south bank of Deep Creek in secs. 32 and 33, T.9 S., R. 33 E.

Area: Two unpatented claims called the Wedding Ring and Lucky Day.

The underground workings consist of a 460 foot adit and a 60 foot shaft. W. L. Merritt is at the mine carrying on underground development. (W. L. Merritt, 1/28/41).

"The workings consist of an adit about 400 feet long, a 60-foot shaft, and a small open cut. There has been no production.

"The mine is in the schist series very close to its contact with the main mass of quartz diorite. The country rock is talc schist, quartz diorite, and quartz-biotite schist.

"There are several small veins and stringers running in different directions, but most of the work has been done in what appears to be a nearly vertical irregular pipe-like mass of quartz. Stringers extend from the mass in several directions. This is probably, at least in part, a replacement mass, for the wall rocks have been intensely silicified, and separated schist layers and ghosts of wall rock are common in the quartz. The massive quartz has a light-blue watery appearance. A few small amphibole crystals are dispersed through it, and it is locally seamed with stringers of sericite. According to Mr. Ray, the ore is richest at the shaft near the north end of the quartz body. Pyrite, chalcopyrite, pyrrhotite, and sphalerite were the metallic minerals seen. Mr. Ray also reports some free gold".

References: Swartley 14:172

Parks and Swartley 16:182

Gilluly, Park and Reed 33:114 (quoted,

RESCUE (Gold)

Susanville Area

Owner: Curley Buys, Payette, Idaho

"The Rescue group consists of three claims owned by Charles Ray of Susanville, adjoining the Gem ground on the west.

"There is an inclined shaft on the property, at present full of water, which is reported by Mr. Ray to be 140 feet deep. A tunnel, now about 200 feet long, has been started below the shaft. It is planned to continue this tunnel until the vein is intersected. No production has been reported from this group.

"The country rock is schist. The strike of the main vein ranges from north to N.10° E. The dip is uniformly about 60° E. Three other smaller veins exposed on the surface strike about N.30° E., and dip 60° E. Quartz is the predominant gangue mineral, but ankerite is rather common. The ore minerals found on the dump were pyrite, sphalerite, pyrrhotite, chalcopyrite, galena, and arsenopyrite".

Reference: Gilluly, Reed and Park 33:113 (quoted)

SIDE ISSUE CLAIM (Gold)
(See Black Hawk Mine)

Susanville Area

SIMCOX PROPERTY (Gold)

Susanville Area

"The Simcox property is half a mile east of the Blackhawk prospect. It is owned by Mrs. Gertie O'Rourke, of Susanville. The workings consist of an adit 516 feet long and three small drifts branching out from the end of the adit. The country rock is talc schist. The workings cut but do not follow several small quartz stringers".

According to Mrs. O'Rourke the owner is now Robert Groom, Hornbrook, California. (H.K.L.10/30/40).

Reference: Gilluly, Reed and Park 33:117 (quoted)

SKYSCRAPER CLAIM (Gold)

Susanville Area

Owner: Elk Creek Mining Co., Yakima, Washington. The property is idle at the present time. (Informant: Gertie O'Rourke 10/30/40).

"The Skyscraper property lies on the top of the ridge between Elk and Deep Creeks, above the town of Galena. The property consists of one claim. There has been considerable work done in the past, but only a small cut is now accessible. The country rock is talc schist. A small vertical vein strikes N.85° W. According to Norman Johnson, \$3000 worth of gold was taken from a small pocket in this vein".

Reference: Lindgren 01:707

Gilluly, Reed and Park 33:117 (quoted)

SOUTH GEM MINE (Gold)
(See Gem Mine)

Susanville Area

STOCKTON GROUP (Gold)

Susanville Area

Owner: Mrs. A. A. Patton, 600 Howard Avenue, Seattle, Washington. The claims are patented; the property is idle. H.K.L. 11/1/40).

"The Stockton property consists of three claims lying southeast of the Badger property. The country rock is slate. There has been some work done in the past, but it is now inaccessible." 1/

Lindgren 01:707 states that "this property is prospected by a 200' shaft".2/

References: Lindgren 01:707 2/

Swartley 14:171

Parks and Swartley 16:214

Gilluly, Reed and Park 33:117 1/

SUSANVILLE PLACERS

Susanville Area

"The placer mines of Susanville were discovered in 1864 and have been worked practically every season since then.

"Elk Creek has produced the most, but other creeks lower down, along the

north side of the John Day, have also yielded considerably. The total placer production is approximately \$600,000.

"The Middle Fork, below Elk Creek, is reported to have produced \$50,000 in fine flour gold, but the creeks usually contain coarse gold, 865 fine.

"The largest gold nugget found on Elk Creek during the more active operations was worth \$480. Deep Creek had one worth \$625. Buck Gulch, below Deep Creek, years ago had one worth \$800, but on June 19, 1913, George Armstrong found another on Buck Gulch weighing 80.4 ounces, which at \$17.60 per ounce would be worth \$1415. Most of the gold in the Elk Creek placers seems to have come from the west side of the creek, although the most productive quartz mine is on the other side.

"Considerable drifting has been done near the Middle Fork of John Day underneath the basalt capping, in hopes of cutting old stream channels in the search for placer gold, but such operations have not been successful because they have as yet been unable to cut through the rim-rock to enter these old channels anywhere near the bed-rock.

"The Middle Fork from a point somewhat above Elk Creek downstream for a distance of 4 or 5 miles, was partially prospected in 1898 with a view to dredging, but nothing came of it. In this same ground in 1913 the entire valley for this distance was under option, and test pits were sunk at various points. The results of these shafts are said to average 14 or 15 feet in depth and to contain sufficient value to warrant a systematic drilling of the ground with a view to the installation of a dredge".

Reference: Swartley 14:169-170 (quoted)

THOMPSON MINE (Gold)

Susanville Area

Owner: Elk Creek Mining Co., Yakima, Washington.

"The Thompson Mining Co., controlled by C. A. Thompson, owns eight claims on the north side of Elk Creek a short distance below the Badger. The property is developed by a 900-foot prospect adit, which runs N.30° E. near the portal but turns near the face and runs N.70° E. The country rock is talc schist and slate. Several small stringers of quartz and gouge have been cut. These strike N.80° E. and dip 60° S., paralleling the schistosity.

Reference: Gilluly, Reed and Park 33:117 (quoted).

OTHER AREAS IN GRANT COUNTY

Middle Fork Area

Geography:

The Middle Fork Area includes the northwest quarter of Grant County and occupies all the basin draining into the main fork of the John Day below Dayville as far east as Dale (Desolation Creek) on the North Fork and Big Creek on the Middle Fork.

More or less parallel northwest-flowing streams empty into the North Fork of the John Day River. The concordant northwest-sloping ridge-tops between the streams are separated by youthful canyons incised in the more mountainous regions into a maturely developed topography, leaving high "prairies" on the valley walls.

Geology:

The area of the Middle Fork mapped many years ago in reconnaissance by Collier (14) is predominantly covered with Columbia River lavas. In the canyons of the John Day River north of Dayville and of the North Fork west of Monument, the John Day formation of volcanic varicolored tuffs is exposed. In the extreme northwestern corner of Grant County, Clarno volcanic sediments appear.

Mines:

Due to the predominantly volcanic nature of the rocks in this area, mineralization is practically absent, and few mining properties have been reported.

BULLY BUTTE QUARTZ CLAIMS

Middle Fork Area

Owner: Ford Peterson, Ukiah, Oregon.

Location: In the center of the SE $\frac{1}{4}$ sec. 23, T.4 S., R.31 E., just east of Bully Creek below Brush Creek $\frac{1}{4}$ mile.

Area: 1 unpatented lode claim.

History: Located April 1938. Some old prospect pits but no previous record.

Geology: Country rock composed of argillite, schist, and quartzite, all in relatively narrow bands and all very highly altered; large gabbroid intrusion 200 yards to the east. Basalt capping has lapped around gabbro cliffs. Large dike of barren white quartz cuts the metamorphics above and long pocket-tracing pits. The traces occur in white, hydrothermally altered and replaced metamorphics, just below the quartzite ledge and above the quartz dike. The assays run up to \$4.50 per ton. It is suggested that mineralizing vapors from the quartz dike were deposited when they hit the impervious quartzite ledge. The only visible ore minerals were limonite and hematite. No sulphide was seen.

Recommendations: Unless higher values are found the ore zone is too narrow to be of economic value.

Informant: J.E.A. 10/13/38

. SILVIES AREA

Geography:

The Silvies Area includes those parts of the drainage basins of the Silvies and Malheur Rivers which lie in Grant County.

The area is essentially a high warped plateau dissected by youthful streams which have developed alluviated flats in the structural basins of Bear Valley and Seneca Valley.

Geology:

The eastern half of the area is made up of Tertiary volcanic rocks, which over much of the western portion have been eroded away to expose a sequence of Mesozoic marine sandstones, shales, limestones, and conglomerates recently described in some detail by Lupton (41). Serpentine outcrop north of Seneca.

VANCILS (Chromite)

Silvies Area

"About 5 miles north of Seneca there is a small belt of serpentine. At Vancils (48) 124 tons has been mined from float; the largest mass found weighed 10 tons. The assays averaged 45 percent of chromic oxide. No ore has yet been found in the bedrock."

Reference: Westgate 21:53 (quoted).

SOUTH FORK AREA

Geography:

The South Fork Area includes that part of the southwestern portion of Grant County drained by the South Fork of the John Day River and its tributaries. It includes all the basin of Murderer's Creek and the district of that name. The boundary extends from the county line at Myrtle Butte northwards through Flagtail Butte and thence westward along the divide between Murderer's Creek and the Middle Fork to the junction of those streams, thence southwest to the county line again.

The area is rugged in the north and east and levels out to the south and west into dissected plateaus. Stream valleys are nearly all youthful with steep canyon walls.

Geology:

The southern half and the eastern edge of this area are largely made up of Triassic and Mesozoic sandstones, shales, a wide band of serpentinous rocks, and small areas of Paleozoic limestones, recently described in part by Lupher (41). In the northern half of the area these older rocks are covered with Tertiary lavas with the exception of serpentine outcropping south of Dayville on the river and on upper Murderer's Creek.

BULL SPRING PROSPECTS (61) (Chromite)

Murderer's Creek District South Fork Area

"Three prospects are situated in the vicinity of Bull Spring, which is near the common corner of sec.15, 16, 21, 22, T.15 S., R.28 E. The workings are in the serpentine that forms a bare ridge northwest of the road between Murderer's Creek and the south fork of Murderer's Creek. No chromite besides that forming thin coatings on slickensided surfaces was seen in place, although a few small pieces of slickensided black ore were found on the dumps."

Reference: Thayer 40:113 (quoted)

DELORE PROSPECTS (47) (Chromite)

South Fork Area

"The Delore prospects are on a bare serpentine ridge between Deer Creek and the South Fork of Murderer's Creek, in the W $\frac{1}{2}$ sec.27 and the SE $\frac{1}{4}$ sec.28, T.15 S., R.28 E. Total shipments amounted to about 50 tons of ore, said to average 54 percent of chromic oxide. The commercial chromite occurs as small sheared lenses in the serpentine. In the lowest cut, fine-grained brown chromite coatings on slickensided surfaces in the serpentine are unusually prominent. The workings include seven open cuts on the northwest side of the ridge, in sec.27, and one cut on the southeast side of the same ridge, in sec.28, where the only ore in place was seen. Here a lens of dense black chromite 3 feet long and 8 inches in greatest thickness trends N.15° E. and stands vertical in serpentine. This ore is somewhat magnetic and contains about 21 percent of iron".

Reference: Thayer 40:112-113 (quoted)

GLASSCOCK CLAIMS (15,16,17) (chromite)

Murderer's Creek District South Fork Area

"The Uncle Sam (15), Queen of the May (16), and Stone & Hankins (17) mines, collectively referred to as the Glasscock claims, are in the E $\frac{1}{2}$ sec.10, T.14 S., R.28 E., about 1 $\frac{1}{2}$ miles west of Fields Creek. The workings are caved and all the deposits are reported to be mined out, except possibly the Stone & Hankins, which is now held by Roy Glasscock as the Another Chance claim. The Uncle Sam and Queen of the May deposits, which are in dense serpentine derived from dunite and olivinite, produced about 40 to 80 tons, respectively, of ore containing more than 40 percent of chromic oxide. The Stone & Hankins mine produced about 300 tons of ore that averaged slightly more than 40 percent of chromic oxide and ran as high as 45 percent. Boulders of high-grade ore are exposed in small cuts near the Stone & Hankins workings, although no sizeable bodies were found in place."

Reference: Thayer 40:111-112 (quoted).

HANKINS (SPRING AND CHROME RIDGE) MINE (45) (chromite)

Murderer's Creek District South Fork Area

"The Hankins mine, described by Allen as the Spring and Chrome Ridge mine, is in the NE $\frac{1}{4}$ sec.12, T.15 S., R.28 E., about a mile north of Murderer's Creek on the crest of the divide west of Oregon Mine Creek. About 65 tons of high-grade ore was shipped in 1918. The ore consists of massive black chromite that occurs in small lenses with slickensided contacts against the enclosing dense dunitic serpentinite. The main body of serpentinite is somewhat pyroxenic and probably derived from olivinite. No minable ore was seen".

References: Thayer 40:112 (quoted).

Allen 38:67

MACK CLAIMS (Manganese)

Murderer's Creek District

South Fork Area

Owner: F. C. Mack, Canyon City.

Location: On Lost Cabin Creek in sec.20, T.15 S., R.38 E., 33 miles from John Day, half by highway, half by forest road.

Development: No work done except two or three very shallow cuts. Manganese oxide, brownish in color, occurs in outcrops and shallow cuts. Acid test showed brown ore had a high percentage of impurities; the darker ore below the brown ore was higher grade.

Geology: Manganese stain seems to be of considerable extent. Geology is obscure but north end of deposit grades into serpentinite. The actual contact was not seen, but some serpentinite in place appears to be impregnated with manganese. Very little work is necessary to uncover this contact. The south contact probably is serpentinite but is under heavy overburden. Presence of reddish and gray chert in an outcrop 1500 feet in length might indicate a body of ore in a chert bed. Width possibly is about 250 feet; there is evidence of manganese distributed over a greater width than this but it appears to be extremely low grade.

The material is chalcedonic in character. One set of fractures has been filled with a hydrated iron oxide accompanied by small amounts of manganite (?) which cements the minute fractures. From evidence of the samples the deposit seems to have been formed by the circulation of meteoric waters. There is no evidence as to the origin of the manganite (?) or the gangue material. This filling probably is of rather shallow depth, and it is questionable whether there is sufficient manganese present to warrant development.

Informants: A. V. Quine (11/27/37)

W. D. Wilkinson (1938)

J. E. Allen (1938)

ROBA BROTHERS (Gold)

South Fork Area

Location: About 17 miles, airline, southwest of John Day, on the west side of Flagtail Mountain. The mine is about three-quarters mile west of the west lookout station in the E $\frac{1}{2}$ sec.13, T.16 S., R.28 E.

Geology:

Country rock is a dark-gray to brown sandstone, which sometimes appeared bluish on fresh surfaces and resembled basalt because of its color, hardness, and fineness of grain. This sandstone is massive and no dip could be determined definitely, but at the entrance to the mine bands in the rock appeared to dip about 53° S. and 30° E. The sandstone grades in places into a fine-grained conglomerate. A few poorly preserved specimens of gastropods were collected.

Development:

The mine consists of a trench 40 feet long, 5 feet wide, and 25 feet deep in the fine-grained sandstone described. Where the trench makes a bend, a shaft 40 feet deep has been sunk. The trench and shaft were sunk on a "seam" which, according to the Roba Brothers, was not more than about $1/8$ inch wide and contained gold in very small flakes. The "seam" is a fracture in the sandstone and the rock on both sides of the fracture has suffered very little alteration.

Informant: McKay 37

MORROW AND UMATILLA COUNTIES

Geography:

These two counties occupy the northwest quarter of northeastern Oregon. The extreme southern portions of Morrow and the southern and eastern edges of Umatilla counties lie in the Blue Mountains. Elevations range up to 5000 feet, but most of the region is a part of the Columbia plateau province, which is essentially a dissected and warped surface with more or less concordant ridge-tops.

With the exception of the southeast portions of Morrow and the south and east parts of Umatilla, where drainage is southward to the North Fork of the John Day River, both counties are drained by northwest-flowing streams which enter the Columbia.

Rainfall is from 10 to 20 inches, being higher in the eastern mountains. Mean temperatures vary from 38° to 66°.

Transportation:

Morrow, and especially Umatilla Counties are well situated as respects transportation facilities. The Union Pacific Railroad bisects Umatilla County from southeast to northwest, and follows the northern margin of Morrow County. Should new locks be installed, the Columbia River would provide inexpensive barge transportation.

Highways form a network which makes accessible most sections of both counties. Pendleton, a city of 8847 population, lies near the geographic center of Umatilla County, and forms the hub of the radiating highway network. Heppner, with a population of 1140, occupies a similar position in Morrow County.

Geology:

Although the mountainous south and eastern edges of Morrow and Umatilla counties expose Clarno volcanics and older Pre-Tertiary rocks, they are predominantly made up of gently tilted and occasionally folded Columbia River basalt, overlain by minor amounts of upper-Tertiary or Quaternary alluvium which has collected in the structural downwarps.

Mines:

Due to the lack of mineralization in the Columbia River basalts, metal mining in Morrow and Umatilla counties is almost absent. There is one development on placer gold which is a result of erosion of other regions and carried into the county by the Columbia River; also there is a possibility of other gold placers on the North Fork of the John Day River within Umatilla County.

The only other mineral production in these counties is of non-metallics. Opals have been produced in the past from amygdaloidal Clarno lavas in southern Morrow County. Coal occurs in a number of localities, many of which are reported by Collier (14). The total non-metallic mineral production of the

two counties for 1940 was from sand, gravel, and crushed rock, and is as follows:

	<u>Morrow</u>	<u>Umatilla</u>
Sand and gravel	\$46,600	\$30,110
Crushed rock	85,985	45,370

COLUMBIA GOLD DREDGING COMPANY

Morrow County

Owner and Operator: Ground is owned by State of Oregon and is leased to Theo Haakonson and B. R. Howard. Address: Irrigon, Oregon.

Location: Located two miles northeast of Irrigon on the Columbia River.

Equipment: Floating boat with 46"x16' trommel having $\frac{1}{4}$ " openings; 50 h.p. International diesel engine furnishes power for boat; $\frac{3}{4}$ -yard Loraine-Thew gas shovel; 100 sq.ft. of sluices having a pitch of 1" per foot; burlap and expanded metal lathe is used in riffles; truck and oxyacetylene welding equipment.

Geology: Gravel is fine. Maximum size of rocks is 4 inches. 30% of gravel is sand. Bedrock has not been reached. Gold is fine and difficult to save.

Remarks: Operators are working one shift to prove ground. Yardage handled is estimated to be 300 yards per day.

Informant: Theo Haakonson, H.K.L., 3/5/41.

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