

5
OREGON

Misc
Par
VOLUME 2

NUMBER 4

DECEMBER, 1916

THE MINERAL RESOURCES OF OREGON

Published Monthly By
The Oregon Bureau of Mines
and Geology

LIBRARY
OREGON DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES
SUITE 965
800 NE OREGON STREET # 28
PORTLAND, OREGON 97232



LIBRARY
BUREAU OF GEOLOGY
TALLAHASSEE, FLORIDA

Handbook of the Mining Industry of Oregon Alphabetical List of Properties; Description of Mining Districts

By H. M. PARKS and A. M. SWARTLEY

306 Pages

Entered as second class matter at Corvallis, Ore., on Feb. 10, 1914, according to the Act of Aug. 24, 1912.

**OREGON
BUREAU OF MINES AND GEOLOGY
COMMISSION**

**OFFICE OF THE COMMISSION AND EXHIBIT
OREGON BUILDING. PORTLAND, OREGON**

**OFFICE OF THE DIRECTOR
CORVALLIS, OREGON**

JAMES WITHYCOMBE, Governor

COMMISSION

**H. N. LAWRIE, Portland
W. C. FELLOWS, Sumpter
J. F. REDDY, Grants Pass
J. L. WOOD, Albany
R. M. BETTS, Cornucopia
P. L. CAMPBELL, Eugene
W. J. KERR, Corvallis**

HENRY M. PARKS, Director

**ARTHUR M. SWARTLEY, Mining Engineer
IRA A. WILLIAMS, Geologist**

Volume 2

Number 4

December Issue

of the

MINERAL RESOURCES OF OREGON

Published by

The Oregon Bureau of Mines and Geology



Handbook of the Mining Industry of Oregon
Alphabetical List of Properties; Description
of Mining Districts

By H. M. PARKS and A. M. SWARTLEY

306 Pages

1916

**OREGON'S RELATIVE ANNUAL METAL PRODUCTION
FOR PAST FIFTEEN YEARS**



Scale—1 inch, \$1,000,000.

Oregon's 1916 production includes the metals gold, silver, platinum, copper, lead, antimony, quicksilver, tungsten and chromium.

The total mineral products sold in the State during 1916 including the non-metallics, will amount to about \$5,500,000, the largest part of which furnished local and cash markets for labor and supplies.

It is the desire of the Oregon Bureau of Mines and Geology to have in its files at all times, up-to-date information regarding mining properties in the state. Users of this handbook will confer a favor by sending in any data that will make the Bureau reports more complete and accurate.

CONTENTS

**Alphabetical list of mines, mining companies
and prospects..... 7 to 241**

The mining districts.....242 to 296

General statement of geology, natural features
and production of the metals.....242 to 248

Description of mining districts, alphabetically
arranged by counties and districts.....248 to 296

Index of properties by counties and districts,
alphabetically arranged.....297 to 306

SOURCES OF INFORMATION

The preparation of this "Handbook of the Mining Industry of Oregon," is based upon field work carried on in the mining districts during 1915 and 1916. The previous reports of the Oregon Bureau of Mines and Geology have been used freely without giving credit to individual authors. The papers in the "Mineral Resources of Oregon" from which material has been taken are:

Petrology and Mineral Resources of Jackson and Josephine Counties, by A. N. Winchell, (August, 1914).

Geology and Mineral Resources of the Sumpter Quadrangle, by J. T. Pardee and D. F. Hewett, (October, 1914).

Preliminary Report on the General and Economic Geology of the Baker District of Eastern Oregon, by U. S. Grant and G. H. Cady, (October, 1914).

Ore Deposits of Northwestern Oregon, by A. M. Swartley, (December, 1914).

Preliminary Survey of the Geology and Mineral Resources of Curry County, by G. M. Butler and G. J. Mitchell, (October, 1916).

The following publications of the U. S. Geological Survey have been quoted, giving credit to the author in each instance, without stating the particular publication or the page from which the quotation is taken:

The Gold Belt of the Blue Mountains of Oregon, by Waldemar Lindgren, (22nd Ann. Rep. part II, 1901).

Mineral Resources of Southwestern Oregon by J. S. Diller, (Bul. 546, 1914).

Roseburg folio, (No. 49), by J. S. Diller.

Coos Bay folio, (No. 73), by J. S. Diller.

Port Orford folio, (No. 89), by J. S. Diller.

Mineral Resources of Grants Pass Quadrangle and bordering districts, by J. S. Diller and G. F. Kay, (Bul. 380, 1908).

Placer Gravels of the Sumpter and Granite districts, by J. T. Pardee, (Bul. 430, 1910).

The reports of the Mineral Resources branch of the U. S. G. S. have been consulted for statistics of production.

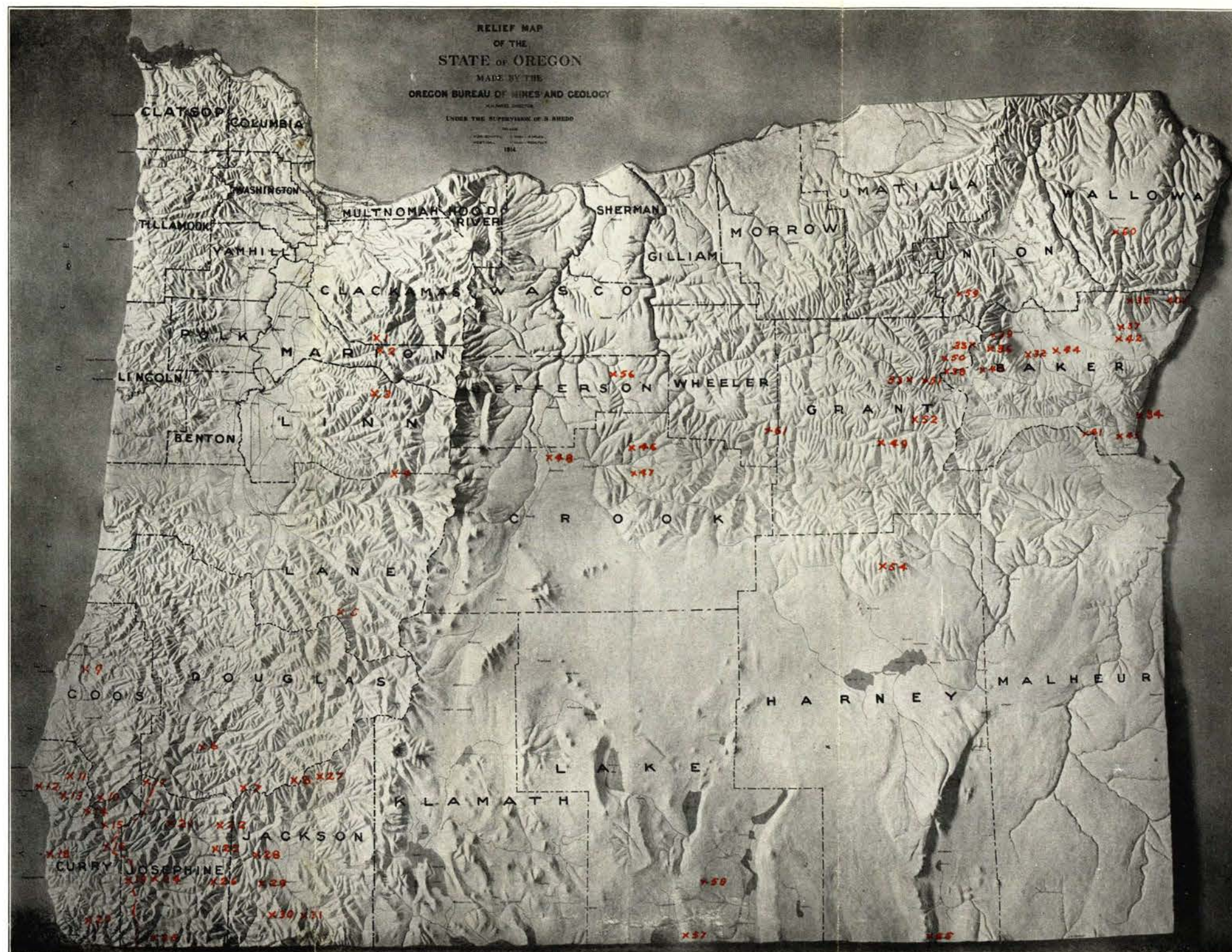
The State Corporation Department has willingly given information relating to the organization and capital stock of the various mining companies.

Officers of the different companies have responded generously to requests for information; and while in the field, mine operators and prospectors have uniformly rendered valuable assistance at all times.

MINING DISTRICTS OF OREGON

Location by number
on map

- 1 Ogle Creek
- 2 North Santiam
- 3 Quartzville
- 4 Blue River
- 5 Bohemia
- 6 Riddle
- 7 Green Mountain
- 8 Drew Creek
- 9 Coos Bay
- 10 Rock Creek (Coos County)
- 11 Sixes River
- 12 Port Orford
- 13 Elk River
- 14 Ophir
- 15 Agness
- 16 Collier Creek
- 17 Mule Creek
- 18 Gold Beach
- 19 China Diggings
- 20 Chetco
- 21 Galice
- 22 Greenback
- 23 Grants Pass
- 24 Illinois River
- 25 Waldo
- 26 Lower Applegate
- 27 Elk Creek
- 28 Gold Hill
- 29 Jacksonville
- 30 Upper Applegate
- 31 Ashland
- 32 Baker
- 33 Cable Cove
- 34 Connor Creek
- 35 Cornucopia
- 36 Cracker Creek
- 37 Eagle Creek
- 38 Greenhorn
- 39 Rock Creek (Baker County)
- 40 Homestead
- 41 Mormon Basin
- 42 Sparta
- 43 Sumpster
- 44 Virtue
- 45 Weatherby
- 46 Ochoco
- 47 Bear Creek Butte
- 48 Redmond
- 49 Canyon
- 50 Granite
- 51 New Eldorado
- 52 Quartzburg
- 53 Susanville
- 54 Harney
- 55 Pueblo
- 56 Ashwood
- 57 New Pine Creek
- 58 Coyote Hills
- 59 Camp Carson
- 60 Wallowa
- 61 Spanish Gulch



THE MINERAL RESOURCES OF OREGON

*A Periodical Devoted to the Development
of all her Minerals*

PUBLISHED MONTHLY AT CORVALLIS BY
THE OREGON BUREAU OF MINES AND GEOLOGY
H. M. PARKS, Director

ALPHABETICAL LIST OF MINES, MINING COMPANIES AND PROSPECTS IN OREGON

ABEL MINE**GREENHORN DISTRICT****BAKER COUNTY**

Same as "Red Bird Mine," which see.

ADVANCE MINING AND MILLING CO. (gold) QUARTZVILLE DIST. LINN COUNTY

Office: 1434 Northwestern Bank Bldg., Portland, Oregon. W. J. Makelim, Pres.; W. M. Rasmus, Sec.; Leonora Makelim, Treas., all of Portland. Capital stock, \$50,000; par value \$5.00; \$34,245 subscribed; \$34,095 issued and paid up. (1916 report).

This company owns 5 claims between Lawler and Albany in Sec. 23, T. 11 S., R. 4 E. A small amount of development work has been done on the property, but information concerning the nature of the ore deposit could not be obtained. It is reported that 2 men are at work on the property at present.

ADYLOTT MINE**ILLINOIS RIVER DISTRICT****JOSEPHINE COUNTY**

See "Williams and Adylott" mine.

AFTERTHOUGHT MINE (gold) UPPER APPLGATE DIST. JACKSON COUNTY

The Afterthought mine, 2 miles south of Applegate, is in Sec. 27, T. 38 S., R. 4 W., near the top of a ridge at an elevation of about 2300 feet. It is owned by J. R. Bailey. The country rock is a dark gray or green to black argillite. The ore is white to bluish quartz with some sulphides and rare calcite. The vein is nearly vertical and strikes N. 70° E. The walls are not clearly defined and they show no gouge. The vein is opened by an adit crosscutting N. 20° E. 50 feet and then drifting N. 70° E. 150 feet. The ore has been milled in an arrastre in the gulch below. A granitic intrusion outcrops on the southwest slope of the ridge about 600 feet from the mine.

AINSWORTH CLAIMS**OPHIR DISTRICT****CURRY COUNTY**

See "Schulz & Ainsworth" claims.

AJAX MINE (gold)**GRANITE DISTRICT****GRANT COUNTY**

The Ajax mine is about 5 miles north of Granite in Lucas gulch, several hundred feet below the Magnolia and explores a parallel vein. The workings include 2 tunnels, a lower extending 280 feet northeast and an upper 112 feet

above it and about 500 feet long. A small production from a shoot 90 feet long in the upper tunnel, now inaccessible, is reported over the period 1905-1906.

The lower tunnel follows a gouge-filled fissure for 280 feet, but the shoot has not been encountered. The material on the dumps resembles that from the Magnolia vein. Manganese oxide was noted along secondary fractures and is reported to have been common in the upper tunnel.

ALASKA COAL OIL COMPANY

ALASKA

Office: 405 Dekum Bldg., Portland, Oregon. Thomas Milburn, 405 Dekum Bldg., Portland, Pres.; Otto Roeber, 405 Dekum Bldg., Portland, Sec.; D. B. McBride, Royal Bldg., Portland, Treas. Capital stock, \$250,000; par value \$50; capital stock all subscribed and paid up; \$159,600 of capital stock issued. (1916 report).

This company's properties are located at Katalla, in Kayak District, Alaska.

ALASKA DOUGLAS GOLD MINING COMPANY

ALASKA

Office: 809 Electric Bldg., Portland, Oregon. F. W. Bradley, 256 Mills Bldg., San Francisco, Cal., Pres.; F. A. Hammersmith, 256 Mills Bldg., San Francisco, Sec.-Treas. Capital stock, \$100,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company's properties are located on Douglas Island, Alaska. \$308.38 worth of improvement work was done in 1915.

ALICE GROUP (gold)

GOLD HILL DISTRICT

JACKSON COUNTY

The Alice group, 4 miles south of Gold Hill on Kane creek, owned by J. H. Beeman of Gold Hill, is in N. E. $\frac{1}{4}$ Sec. 11, T. 37 S., R. 3 W., not far from limestone quarries, at an elevation of 2300 to 2400 feet by barometer. Lessees are now (1913) taking out a footwall streak of high grade oxidized ore near the surface next to old workings. The main vein consisting of solid quartz is not being mined, as it is too low grade for lessees; it strikes N. 12° E. and dips about 60° E. An old adit about a quarter mile to the northeast discloses about 250 feet of workings on a vertical quartz vein averaging 2 to 3 feet in thickness, containing some pyrite, abundant pyrolusite, and some gypsum. A lower adit opens a 3-foot quartz vein which strikes north and dips 48° E.; it is on or near an irregular contact between dark argillite and an andesitic intrusive. As shown in the drawing, the crosscuts from the main drift are wholly or partly in quartz which is supposed to be part of a large vein which is represented in the main crosscut entry by quartz seams in wall rock.

ALMEDA CONSOLIDATED MINES COMPANY GALICE DIST. JOSEPHINE COUNTY

Office: 201 Board of Trade Bldg., Portland, Oregon. Thos. S. Burley, Pres.; Hortense Thurman, Sec.-Treas., both of Portland. Capital stock, \$15,000,000; par value \$5.00; \$13,818,835 subscribed and issued; \$11,688,027.96 paid up. (1916 report).

For description see "Almeda Mine."

ALMEDA MINE (copper-gold)

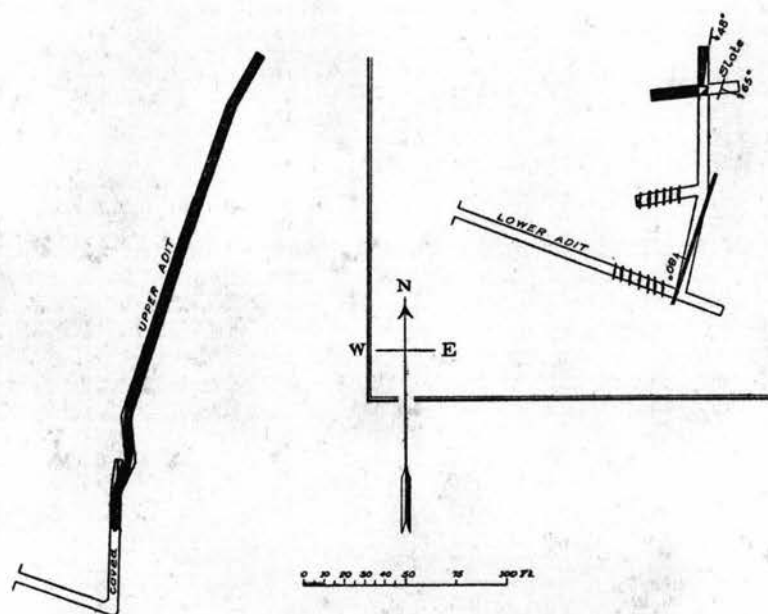
GALICE DISTRICT

JOSEPHINE COUNTY

The Almeda mine is on the north bank of Rogue river in the S. E. $\frac{1}{4}$ of Sec. 13, T. 34 S., R. 8 W., about 26 miles below Grants Pass, at an elevation of 600 to 1600 feet above sea level, the most important workings being at an altitude of about 750 feet. The mine is reached by a good stage road of 17 miles from Merlin, a station on the Southern Pacific Railroad.

The ore deposit on which the mine is located is especially valuable for its

tenor of copper, but it contains also gold, silver, lead and a little zinc. The deposit occupies a zone of faulting along a contact between dacite porphyry and argillite, being confined chiefly to the former. The argillite or slate has been assigned to the Galice formation of the Jurassic period by means of fossils



Alice mine, main adits

(*aucella erringtoni*) found about 100 feet east of the Almeda mine. The contact between this argillite (in places a true slate) and igneous intrusive rocks (including dacite porphyry in places) has been traced by Diller from Briggs creek valley in T. 36 S., R. 8 W., for more than 20 miles to Reuben spur on the north line of T. 33 S., R. 7 W. In general its course is north-northeast and it dips steeply to the east, as the sedimentary formations do in this region. The fault on which the mine is located has not been traced continuously more than about 3000 feet, but it is so prominent it is locally known as the Big Yank lode. It strikes nearly due north and has a steep dip to the east.

The Almeda mine is more fully developed than any other mine in southern Oregon; this is due in part to the fact that it is remarkably well situated for systematic development, being in the narrow but traversable canon of a river which here gives a natural transverse section of the lode to a depth of at least 500 feet. The development, which consists of over 6000 feet of underground work, is therefore largely in the form of drift adits at five different levels. These are supplemented by a vertical shaft reaching a depth of 500 feet, with levels (not fully opened) at each 100 feet. The workings are shown in plan and in longitudinal section in the drawing. They open the deposit for about 1000 feet horizontally and about 800 feet vertically.

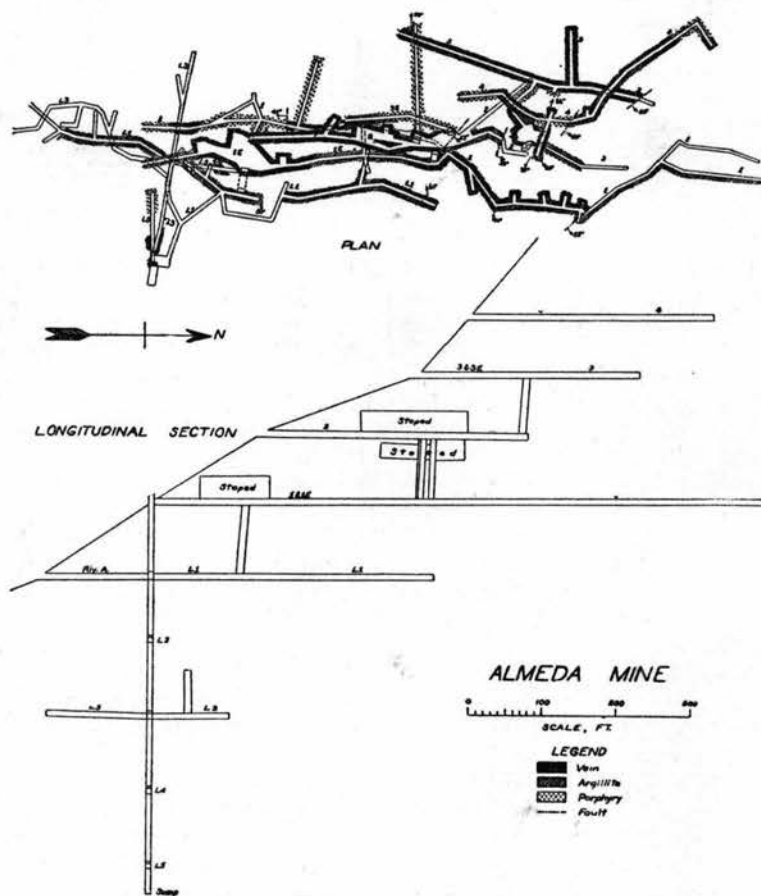
Although classified by Diller as quartz porphyry or alaskite, the porphyritic footwall rock of the Almeda mine contains phenocrysts of plagioclase and quartz in a matrix of plagioclase, quartz, epidote, chlorite, magnetite (ilmeneite?), and possibly a little orthoclase, but clearly not much. Mineralogically it is therefore a dacite porphyry. The chemical analysis which follows fully confirms the microscopic classification.

Composition of Dacite Porphyry Footwall from Almeda Mine

(S. W. French, analyst.)

SiO ₂	55.92	Approximate mineral composition	
TiO ₂ .....	.75		
Al ₂ O ₃	19.66	Quartz	15.6
Fe ₂ O ₃	1.94	Orthoclase	2.3
FeO	4.76	Plagioclase	56.4
MgO	5.27	Chlorite	22.1
CaO	5.77	Epidote	
Na ₂ O	3.26	Magnetite	2.8
K ₂ O .....	.38	Ilmenite	1.4
H ₂ O+	2.90		
H ₂ O- .....	.06		
	100.67		100.6

Adit No. 4 enters in porphyry; at 40 feet from the portal it passes into the vein which here strikes N. 48° E.; the first crosscut to the west terminates in the vein, which here strikes N. 4° E. and dips 86° W.; the crosscut eastward ends in a small porphyry dike in argillite, the dike striking N. 30° W. and dipping 60° N. E.; at about 150 feet from the portal the adit passes through a fault which strikes N. 55° W. and dips 60° N. E.; at about 120 feet farther on the adit again enters the vein with its normal argillite hanging wall; the



Plan and longitudinal section of the Almeda mine

same vein is doubtless continuous to the breast of the adit, as shown in the drawing, although it is not followed all the way by the working.

Adit No. 3 is in vein material on much of its course; 20 feet from the breast it cuts a fault with 2 to 3 feet of soft gouge which strikes N. 36° W. and dips 60° N. E.; the crosscut westward is in vein material and mineralized porphyry all the way; the crosscut eastward passes through 40 feet of porphyry and then enters vein material which grades into a stoped ore body.

Adit No. 3 East passes from argillite to porphyry at about 55 feet from the portal; the contact here strikes N. 20° E.

Adit No. 2 enters in vein material which opens into stoped ground at 140 feet from the portal; 120 feet farther on the argillite hanging wall comes into view beyond a fault which strikes N. 50° W. and dips 55° N. E.; 75 feet beyond the hanging wall is offset about 20 feet eastward by a fault which strikes N. 68° W. and dips 36° N. E.; at the breast the hanging wall of the main vein strikes N. 30° E. and dips 75° eastward.

Adit No. 1 enters in porphyry, passes through low grade ore between 40 and 75 feet from the portal; passes a fault which cuts off the porphyry 195 feet from the portal, the fault striking N. 89° W. and dipping 45° S.; and encounters the main slate hanging wall at about 525 feet from the portal; here the hanging wall strikes N. 15° E. and dips 40° E.; about 120 feet farther on the drift turns to follow a fault, which strikes N. 42° W. and dips 55° N. E., offsetting the hanging wall about 125 feet northwestward as measured along the fault plane. The crosscuts westward from this adit are in altered porphyry, probably somewhat mineralized; the longest one discloses a vertical wall at the breast which strikes N. 4° W. The southernmost crosscut to the east passes through porphyry into low grade ore about 15 feet from the main entry. The next crosscut to the east enters the argillite hanging wall, striking N. 10° E., about 30 feet from the main drift.

Adit No. 1 East passes into ore at 70 feet from the portal by penetrating the argillite hanging wall, which here strikes N. 12° E. and dips 70° E.; 150 feet farther on the entry passes into the hanging wall, from which it emerges into the vein material at about 350 feet from the portal; north of a raise nearby the hanging wall dips only 48° E. It is worthy of note that the lower the level the farther south are the stopes; indeed, the main ore shoot seems to be roughly parallel with the present surface.

Level No. 1 on the river adit is driven in argillite and slate for the most part; at 50 feet from the portal it reaches the hanging wall, which it follows to the breast, except for two stretches of 60 and 120 feet, respectively, which are in the argillite. On this level the hanging wall has an average dip of about 80° E.; near the breast it is locally overturned to a dip of 60° W.; the average strike is about N. 10° E., but it varies from N. 50° E. to N. 30° W. Very little stoping has been done on this level.

When the Almeda mine was visited in September, 1913, the levels below the river adit were inaccessible because they were filled with water. Therefore the following description of these levels is quoted from Diller's report:

On the 300 foot level, within a foot of the contact, the slates, usually dark, are baked light gray, and very hard. They are seamed with calcite, especially on the shearing planes. Rich copper ore was noted near the indurated slates on the 300 foot level, a short distance north of the crosscut from the shaft. The thickness of the principal ore body on the 300 foot level is about 15 feet.

I visited the 500 foot level and followed the crosscut from the shaft westward 96 feet to the end, collecting samples at both ends and at two intermediate points. By the shaft the rock is in some places impregnated with pyrite to such an extent that nearly one-fourth of the mass is pyrite. There is much less pyrite 12 feet from the shaft, and from that point to the western end of the crosscut pyrite, though present, is less conspicuous. The samples taken on the 500 foot level near the shaft and 12 feet west of the shaft were assayed by E. E. Burlingame & Company, who report a gold content of 20 cents a ton in each. One of the samples contained a trace of silver. The rock traversed by the crosscut for 96 feet

west from the shaft on the 500 foot level is highly siliceous. The contact of the quartz porphyry with the slates on the 500 foot level appears to me to be at the foot of the shaft. In this view I have been confirmed by a microscopic study of thin sections of the rocks collected along the crosscut. The rocks still retain much of the original structure of the quartz porphyry impregnated with pyrite and are strongly contrasted with samples of the indurated slate found elsewhere in the mine. The absence of a considerable body of ore at the contact by the shaft on the 500 foot level does not necessarily mean that ore does not go down to greater depths, for according to the pitch of the ore shoots the ore should be looked for in the contact along the 500 foot level south of the shaft.

The ore of the Almeda mine has been produced wholly, or almost wholly, by replacement of porphyry. The argillite hanging wall is definite and in many places marked by 6 to 12 inches of fault gouge, but the footwall is quite indefinite, the ore grading into less and less replaced porphyry. The most important ore body is in general next to the argillite, but in places some ore is found in the porphyry, in which case both walls are indefinite, unless one wall has been produced by faulting.

The copper ore near the hanging wall has a gangue of barite with very little quartz and occasional seams of calcite. This ore contains the following minerals: pyrite, chalcopyrite, bornite, chalcocite, sphalerite (pyrrhotite?), galena, malachite, azurite, melaconite (?), native copper, native gold, barite, quartz, calcite, sericite, serpentine (?) and celestite (?). The last mineral seems to be in zones intergrown with barite in certain samples. Mr. Crouch, assayer at the Almeda in 1913, reported a little strontium in some of the ore. A sample from stope 1, adit 2, has barite, calcite, chalcopyrite and pyrite so intergrown as to be probably simultaneous in origin. A sample from adit 1 shows a veinlet of pyrite later than chalcopyrite and barite; another sample from the same adit shows veinlets and cement of later barite, doubtless "secondary." A sample from level 1 or the river adit shows primary intergrown barite, pyrite, sphalerite and galena, which completed crystallization in the order named. A sample of gypsum obtained from Mr. Crouch, the assayer, and said to come from the 300-foot level of the Almeda, is in thin section partly granular to subhedral and partly in long prisms; twinning is present, but not abundant.

The baritic copper ore is found in lenses or shoots lying near the hanging wall and generally 6 to 15 feet thick. But pyrite has penetrated the porphyry to much greater distances, and in some places it contains enough gold to make a low grade ore. Such ore is quite different from the baritic copper ore, being a siliceous pyritic gold-silver ore found west of the former, and more irregular in occurrence. If the whole mass of pyritized porphyry could be mined at a profit the future of the Almeda would be assured, because the pyrite extends in places at least 150 feet into the porphyry, but most of this material is too low grade to work.

According to Mr. H. P. Holdsworth, engineer for the Almeda Company in 1911, average analyses of the two types of Almeda ore are as follows:

AVERAGE ANALYSES OF ORES FROM THE ALMEDA MINE

	Baritic copper ore	Siliceous gold-silver ore
SiO ₂	8.8 to 5.1	62.9
Al ₂ O ₃	8.0 to 10.9	5.6
FeO .....	.....	11.5
CaO	8.0 to trace	2.1
BaO .....	.....	8.1
BaSO ₄	47.8 to 28.2	
FeS ₂	27.0 to 48.1	
CuFeS ₂	6.4 to 6.8	
S .....	.....	8.3

ASSAYS OF ALMEDA ORES

Copper	1.5 to 4.5 per cent	0.3 per cent.
Silver	3.3 to 12.2 ounces per ton...	6.4 ounces per ton.
Gold	0.12 to 0.42 ounces per ton...	0.14 ounces per ton.

The Almeda Consolidated Mines Company, owning the Almeda mine, built a 100-ton matting furnace at the mine in 1908. The first attempts to smelt the ore were not successful, but later results were more satisfactory. According to Mr. Holdsworth:

The furnace is 36 inches by 72 inches at the tuyeres and we averaged a little over 100 tons a day—that is, 100 tons of ore besides the coke and slag. Ran semipyrritic smelting ore from 6 to 7 per cent coke. As the iron and barium occur as sulphide and sulphate respectively, there was about 26 per cent sulphur in the charge. Could average about 30 tons a day more when running semipyrritic smelting than when running straight coke smelting. The following are typical slags:

COMPOSITION OF SLAGS FROM ALMEDA MATTING FURNACE

	1	2	3	4
SiO ₂	30.9	31.8	31.1	38.9
Al ₂ O ₃	10.6	13.5	9.9	4.7
FeO.....	24.9	24.0	25.3	22.3
CaO.....	3.1	3.9	4.8	1.3
BaO.....	30.4	26.9	29.1	32.9

Though the percentage of BaO and alumina is high, they run very well, with seldom a loss of 0.3 per cent copper; usually from 0.15 to 0.2 per cent copper. The ratio of concentration is from 12 to 1 to 20 to 1.

The Almeda mine is equipped with 3 gasoline engines of 175 H. P. and two air compressors having a capacity to run 23 drills, as well as an engine at the shaft to run the hoist.

The mine passed into the hands of Thomas S. Burley, receiver for the Almeda Consolidated Mines Company, on August 23, 1913. The company owns the Rand mine, across the river and south of the Almeda, and a placer mine near the Almeda. At one time it had an option on the Cold Spring claim near the Sugar Pine mine. The receiver opened the Almeda and ran the smelter for 3 weeks, producing 3 carloads of copper matte. He then shut down the furnace to make concentration tests on the ores and to build a concentrating plant.

The total production of the smelter during 1913 is reported to have been 6 carloads of matte, worth about \$40,000.

A new company has recently been formed under the name Almeda Mines Company, with Thomas S. Burley as the president. The stockholders are much the same as of the old company.

The new company has given a lease on the mine to Mr. P. B. Wickham, who has been operating it since the summer of 1915. Mr. Wickham is stoping ore from the upper levels of the mine and running the smelter intermittently and shipping his matte to the Tacoma Smelting Company.

ALMEDA MINES COMPANY GALICE DISTRICT JOSEPHINE COUNTY

Articles of incorporation filed July, 1916, by Thos. S. Burley and S. C. Spencer, of Portland; Nat P. Ellis, of Waverly, Iowa; C. M. Huddle, of Dayton, Ohio, with office at Grants Pass. Common stock, \$3,000,000; preferred stock, \$500,000; par value \$1.00.

See "Almeda Mine."

ALPS MINING COMPANY

NEVADA

Office: Portland, Oregon. H. W. Rand, 916 E. Taylor St., Portland,

Pres.; C. S. Shea, 861 E. Main St., Portland, Sec. Capital stock, \$150,000; par value twenty-five cents; capital stock all subscribed, issued and paid up. (1914 report).

This company's properties are located in the Ely mining district, Lincoln county, Nevada.

ALTA MINE (gold)**ILLINOIS RIVER DISTRICT****JOSEPHINE COUNTY**

Diller says:

The Alta mine on Josephine creek, 4 miles west of Kerby, consists of 3 claims. For some years the mine was worked only as a placer, but recently a lode mine was opened in the bluffs bordering the placer and a mill erected to crush the ore. The country rock is serpentine derived from peridotite and cut by a large dike composed of a rock related to dacite porphyry. The dike ranges from 25 to 40 feet in width between serpentine walls and is practically vertical. It strikes N. 40 degrees E. and has been traced by Mr. Wilson about a mile and a half. Many smaller parallel dikes of the same material cut the serpentine of that region, so that the relation of the ore-bearing rock to the serpentine is evident.

The ore is chiefly pyrite, occurring in scattered grains through the rock and more abundantly in small quartz veins, apparently with some chalcopyrite and possibly pyrrhotite. In some places when the rock is pulverized and panned it is found to contain not only pyrite but apparently considerable free gold. As the mine is in the early stage of its development, little is known of the distribution and extent of the disseminated ore. A good sample of the fresh rock with conspicuous blotches and scattered grains of pyritic ore in joints and veinlets of quartz was assayed by E. E. Burlingame and Company of Denver, for the Geological Survey, and it yielded 0.02 ounces in gold per ton. About a dozen sectional samples assayed by local assayers were reported to me by Mr. Wilson and they averaged about \$5 in gold per ton.

A "Lane slow-speed Chilean mill" has been erected to crush the ore. The rock is first run through a breaker, and after it issues from the mill is run over plates to Johnson concentrators. The mill is run by a 25-horsepower steam engine and has a capacity of 40 tons in 24 hours. Mr. Wilson reports a satisfactory test run of about 500 tons, made in the fall of 1911, at a cost of 80 cents a ton by water power and \$1 a ton by steam. After amalgamation and concentration the tailings are reported to show no trace of gold. The overburden of the mine is gravel, and during the winter the water is used for hydraulicking.

ALTAN MINING COMPANY (Wisconsin corporation)**JACKSON COUNTY**

This company filed declaration Nov. 20, 1916. Home office, 120 Wisconsin St., Milwaukee, Wis. Local office, Ashland, Oregon. George W. Barrow, Ashland, attorney-in-fact.

ALTON MINE**ASHLAND DISTRICT****JACKSON COUNTY**

For description see "Barron Mine."

AMALGAMATED MINES COMPANY (gold) EAGLE CREEK DIST. BAKER COUNTY

Office: Baker, Oregon. Wm. Deffren, Pres.; W. Burnham, Sec.; G. J. Burnham, Treas., all of Spokane, Wash. Capital stock, \$1,000,000; par value \$1.00; all subscribed and paid up; \$754,824 issued. (1916 report).

Lands: 8 quartz claims on Paddy creek, a tributary of Eagle creek. Considerable work has been done upon lens-like veins in sedimentary rocks.

AMERICAN ALMADEN QUICKSILVER & GOLD MINING COMPANY (mercury)**OCHOCO DISTRICT****CROOK COUNTY**

Office: 100½ Fourth St., Portland, Oregon. W. B. McKinney, Pres.; E. N. Wheeler, Sec.-Treas.; G. W. Tillotson, Howard, Oregon, manager; Capital stock, \$1,500,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company has 3 claims, the Eldorado, Leroy and White Star, located near Lookout mountain in Sec. 20, T. 14 S., R. 20 E., about 11 miles from Howard, and about 25 miles from Prineville, at an elevation of about 6000 feet. The region is rugged and well timbered.

The country rock is probably andesite, in places considerably altered, in which the cinnabar ore occurs in narrow fissures, the extent and number of which were not determined.

Development work consists of several tunnels. There is a battery of 8 retorts to recover the mercury from the ore taken from the several tunnels.

ANDERSON GROUP CHINA DIGGINGS DISTRICT CUREY COUNTY

Articles of incorporation were filed with the Corporation Commissioner Aug. 25, 1916. Officers: John Hampshire, Pres.; F. F. Ryan, Vice-Pres.; J. G. Wilson, Sec., Portland, Oregon; R. B. Miller, Treas., Grants Pass. Capital stock, \$1,000,000; principal place of business, Portland, Oregon.

AMERICAN EXPLORATION COMPANY

See "Hustis & Anderson" group.

ANHYDREOUS MINES COMPANY

Articles of incorporation were filed with the County Clerk of Multnomah county Aug. 2, 1916. Capital stock, \$100,000; the principal place of business is Portland, Oregon. The incorporators are Chas. A. Rice, Ambrose D. Fish and W. E. Rogers.

ANDERSON (G. E.) PROSPECT (gold, etc.) ILLINOIS RIVER DIST. JOSEPHINE CO.

Diller describes this property as follows:

Mr. G. E. Anderson has recently opened a prospect near Illinois river and the mouth of Rancherie creek in greenstone close to the border of serpentine. The sheared belt of rock, 10 feet in width, carrying a fair grade of ore, runs N. 45° E. and dips 47° SE., approximately parallel with the neighboring contact. Irregular quartz veins occur in about 4 feet of this belt and yield some free gold when mortared and panned. The most prominent ore minerals are pyrite, chalcopyrite, and galena, so that the ore contains copper, lead, and possibly silver, as well as gold. Assays are reported from \$1.80 to \$180 a ton on picked samples, and the quartz is said to average about \$9 a ton.

ANNALULU GOLD MINING COMPANY (gold) CRACKER CREEK DIST. BAKER CO.

Local name, Annalulu mine.

Office: Sumpter, Oregon. J. F. Rand, last Vice-Pres.; A. J. Trimble (deceased), last Sec.; Treas. unknown. Capital stock, \$100,000; par value \$1.00; amount subscribed, issued and paid up not known. (1914 report).

Six miles by wagon road from Sumpter, a station on Sumpter Valley Railroad (narrow gauge), on branch of Silver creek, in Sec. 6, T. 9 S., R. 37 E. Elevation, 5320. Lands, one patented claim, a fractional claim and millsite.

The North Pole-Columbia lode, according to W. Lindgren (p. 667), continues clearly marked across this property. This property was visited in 1914. The dump indicated that the shaft had been sunk for a few hundred feet, but little ore was to be seen on the dump, and general impressions were discouraging.

Lawrence S. Donaldson, of Minneapolis, Minn., says:

Company has been inactive for several years. I don't know who the present officers are or where they can be found and cannot ascertain as a stockholder.

ARROWHEAD MINE (gold) LOWER APPLIGATE DISTRICT JOSEPHINE COUNTY

The Arrowhead mine, 14 miles south of Grants Pass, near head of Powell creek, is owned by Mr. Wooster, and is at an elevation of about 2900 feet, as measured by barometer. The trail to the mine leaves Powell creek at a small reservoir. An adit extends S. 52° W. 58 paces, and thence S. 35° W. 20 paces to the breast. The last course is on a vein of quartz, which is 4 to 15 inches wide; pyrite occurs in the quartz and also in the greenstone wall rocks.

ARGO GROUP (gold) GALICE DISTRICT JOSEPHINE COUNTY

The Argo group of claims is on the west side of Rogue river, about 2 miles below the Alameda mine. It is opened by 3 short adits near the river level, two of which are now caved shut. The other adit extends S. 37° W. about 70 feet and thence S. 57° W. about 20 feet. The country rock is a light colored

somewhat schistose "greenstone," which on microscopic examination appears to be a dacite, probably tuffaceous. According to Diller, "Irregular quartz veins, stringers and kidneys occur in a belt about 3½ feet wide. They strike N. 28-35° E. and are generally vertical, but in some places dip 76° N. W." In the workings still open no distinct vein was seen by the writer. The Argo is equipped with a 16-ton rotary ball and tube mill and a water wheel; it has been idle for several years.

This group of claims is now owned by Bigelow brothers.

ASHLAND COAL MINING COMPANY ASHLAND DISTRICT JACKSON COUNTY

Coal on the north side of Emigrant creek has been opened by two incline shafts which are said to reach a depth of about 400 feet. They are now caved and filled with water. Near the surface the shafts dip about 25° in a direction N. 50° E., apparently following the dip of the coal. This outcrop is about 4 miles east of Ashland, and about a quarter mile east of Lithia Springs, which are on the south side of Emigrant creek. This coal is said to be owned by the Ashland Coal Mining Company (dissolved Jan. 3, 1912); it is in Sec. 7, T. 39 N., R. 2 E.. At the bottom of one incline shaft, which was said to be 425 feet deep on an incline of 27°, the following section was reported by E. D. Briggs, of Ashland:

Section at Slope of Ashland Coal Mining Co.

	Feet	Inches
Coal	1	
Coaly shale		3-5
Coal		6
Coaly shale		3-5
Coal		6
Shale with thin seams of coal	8	6
Hard smooth coal		10-12
Coaly shale		2-5
Soft coal		10-12

Section exposed 13 feet.

The coal at this locality was said to be of a good grade. It was apparently sub-bituminous in character. In a report issued in 1909 J. S. Diller mentions this mine as in active development and states that the slopes opened two coal beds, one 12 feet and the lower 5½ feet thick, separated by 50 feet of slippery shale and shaly sandstone. He says further:

The coal beds are made up of streaks of good coal locally 6 inches thick, and separated by coaly shale. The coal breaks out in blocks and contains a considerable percentage of sulphur. The disturbing feature at this prospect are irregular masses of old lavas, which appear not only in all the entries, but at various levels on the surface and in bluffs nearby along the creek. Where the coal is in contact with the lava the latter appears to be the older. The abundance and irregularity of these lava masses render the extent of the coal beds a matter of doubt.

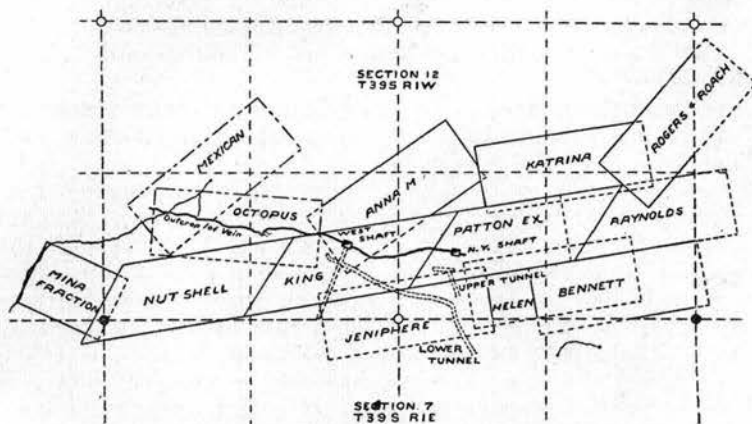
ASHLAND MINE (gold)

ASHLAND DISTRICT

JACKSON COUNTY

The Ashland mine is opened by means of the West shaft, about 900 feet deep, as measured on the incline of about 38°, reaching a vertical depth of about 800 feet beneath the top of the ridge. It is opened further by an adit, crosscutting westward about 500 feet to the vein and drifting on the vein about 1500 feet to the shaft at a depth of 250 feet on the incline. The vein is also reached by the York shaft and an upper adit connected therewith. The chief vein has an average strike of N. 19° E. and a dip of about 40° E. There are two important ore shoots in the vein, one being opened by the York shaft and the other by the West shaft. Both pitch to the south and seem to converge downward. Most of the ore above the adit level has been removed. The vein is regular and persistent, varying in thickness from 2 to 12 feet; the quartz varies in thickness from 0 to 10 feet and occurs in lenses reported to pitch

to the south. The vein varies only gently in strike and dip and is not faulted so far as open to inspection. It is in a country rock of coarse tonalite, fine grained diorite, hornblendite and mica schist cut by a few dikes of aplite. The aplite is much more abundant on the hillside east of the mine than it is in the workings.



Ashland mine, showing outcrop and main workings

According to information received from H. V. Winchell of Minneapolis, who examined this mine in 1899, there are several quartz veins on the Ashland ground, only two of which have been developed.

In size the veins vary from a foot to ten or twelve feet in thickness and some of their outcrops can be traced for considerable distances across the Ashland claims. Near the surface and to a depth of one hundred feet or more the veins are oxidized and the sulphides have been removed by leaching. Below this depth, however, the ore is still free-milling, showing that the gold is mechanically associated with the pyrite instead of occurring in such an intimate admixture or combination that the ore is refractory and only to be treated by some chemical process like smelting or cyaniding.

The vein filling is quartz and pyrite with more or less country rock. The walls are very smooth and well defined and there is always a gouge or selvage that makes easy mining or stoping of the ore.

The vein on which the greatest amount of development work and mining has been done varies in thickness from two to twelve feet. The ore is of two grades, shipping ore and milling ore. The shipping ore occurs in somewhat irregular shoots and bunches throughout the mine, and runs from \$50 to \$200 per ton in gold, averaging about \$100. The milling ore carries from \$3 to \$30 per ton in gold and during the year 1898 averaged about \$13 per ton. About 55 per cent of the gold is recovered from the plates, and about 10 per cent is obtained from the concentrates. The last ore milled produced concentrates worth about \$75 per ton as compared with an average value of \$50 to \$60 per ton, indicating increased value with depth.

Two principal ore shoots are known in the mine, although a large portion of the ore outside of these shoots would pay for treatment, and although more or less scattered bodies of shipping ore are encountered everywhere in the vein, suggestive of similar and more continuous as well as larger bodies in depth.

The best defined and most regular ore shoot is that formerly worked through the York shaft and now producing ore in the upper and lower adits. This ore is largely oxidized and is worth from \$25 to \$40 per ton; the shoot pitches toward the south at an angle which decreases considerably about 200 feet above the lower adit.

Another ore shoot has been worked in the West shaft, and produced shipping and milling ores to the lowest levels reached. This ore was not so much oxidized, but in places it was very rich, some large masses showing free gold and rich sulphides all over the fractured surfaces.

These two ore shoots seem to converge downwards and there is good reason to believe that they are either upward branches of one large ore body or that they will be found close together forming a large and rich deposit at greater depth.

According to J. P. Burrall, of New York, the ore north of the shaft was regular in quantity, but of rather low grade; south of the shaft the ore con-

tained more quartz and pyrite and was of higher grade. Large bunches of pyrite were sorted out for shipment to a smelter. Near the shaft the ore was irregular both in quantity and value, but evidently grew better in both respects as the work progressed to the south. A mill run made in March, 1899, yielded about \$40 a ton on the plates and a concentrate carrying about \$325 a ton. At that date the development work was reaching an important ore shoot which pitched to the south. The high grade pyritic sulphide ore contained free gold, recoverable by panning, while low grade ore of similar appearance yielded nothing on panning.

Soon afterward the mine was closed by injunction proceedings brought by owners of adjoining ground, and very little work, aside from the construction of a 10-stamp mill, has been done since.

In 1898 and 1899 the ore from the Ashland mine was treated in a 5-stamp mill operated by water power. It was located at the city of Ashland, about four miles from the mine. The cost of hauling ore from the mine to the mill was between \$0.75 and \$1.00 per ton. Since then a 10-stamp mill has been erected at the mouth of the West shaft at an elevation of 3350 feet by aneroid. It is equipped with a 6 by 10 Blake crusher, two 5-stamp batteries, Challenge feeders, two 5 by 15 feet amalgamating plates in sections of 7½ feet, and two 6-foot Johnston vanners. The mill has been but slightly used. Both mill and hoist were operated by steam from a horizontal fire-tube boiler, which is still on the ground.

The prospects for making a valuable and important gold mine at the Ashland are very unusually good and it is to be hoped that difficulties in regard to ownership may be adjusted so that development may proceed.

This mine has recently been taken over by Mr. A. W. Bartlett, of Ashland, Oregon, and associates. Mr. Bartlett proposes to mine and mill a large tonnage of ore above the 250-foot level in the old stopes and in the wall rocks, where he claims sufficient mineralization has taken place to allow them to be worked with profit. Mr. Bartlett purchased a part of the mill machinery of the Braden mine and installed it at the Ashland during August and September, 1916.

AXTELL MINE (Moss Rose Group) (gold-silver) ELK RIVER DIST. CURRY COUNTY

In Sec. 8, T. 33 S., R. 14 W. A series of quartz mines in greenstone which strike N. 60° E. and dip 54° N. W., as shown in an open cut, where quartz veins up to 1 foot wide form a mineralized zone over 12 feet wide. Chalcopryrite in fair amounts scattered through quartz and pyrite in greenstone near veins.

BABY MINE (gold)

GRANTS PASS DISTRICT

JOSEPHINE COUNTY

The Baby mine is 9 miles southeast of Hugo on Corn creek, in the N. W. ¼ Sec. 16, T. 35 S., R. 5 W., on the east side of Walker mountain. It is owned by W. A. Sharp, of Grants Pass.

This mine was located in 1897, and is said to have yielded more than \$20,000 worth of gold. It is equipped with a 2-stamp mill (formerly 5 stamps), with an 8-foot plate, a crusher, 2 concentrating tables and 2 boilers. It is opened by 2 adits with about 1500 feet of underground work. The main adit is a crosscut for more than 300 feet leading to about 500 feet of drifts. There are several quartz veins in gabbro country rock. The most important vein averages about 4 feet in width, but varies to fissure zones more than 10 feet wide. The vein strikes northwest and dips to the northeast usually at high angles, but locally at much lower angles. Faults are abundant; certain prominent faults strike N. 80° E. with a dip of about 50° W., or strike N. 45° E. and dip 50° S. E. The vein material consists of coarse vein quartz, partly brecciated, with a little calcite and some pyrite. Free gold occurs in the

quartz. Sulphide concentrates are said to contain \$75 a ton in gold. The gabbro country rock contains abundant labradorite and augite with some chlorite, clinozoisite, sericite and serpentine, and very little chalcopyrite. The mine has been idle for several years.

BACON AND MILLER GROUPS (gold) CHINA DIGGINGS DIST. CURRY COUNTY

These groups were not visited, but Diller describes them together as follows:

Recent strikes of the Higgins mine have greatly invigorated prospecting in that region, and numerous claims have been located near the same horizon to the south on Miller creek and Baby Foot creek, tributaries of the Chetco.

The Miller and Bacon prospects are on the ridge between Miller creek and Baby Foot. At the northern foot of this spur, along Miller creek, a mass of serpentine strikes nearly east and west and cuts the volcanic greenstones which form the body of the ridge. The greenstones are well exposed in the great bluffs overlooking Baby Foot, and are intruded by smaller masses of serpentine, off-shoots of the larger masses which lie at some distances on both sides.

Considerable quartz occurs in irregular veins or bunches in the greenstone, especially near the contact with serpentine, where it is impregnated with chalcopyrite and pyrrhotite. The veins strike in general about N. 60° E. and dip S. E. Their gold content is not evident, though it is said that assays show a considerable amount. The gold at present remains in the decomposed and rotten rock ready to be released by sluicing.

In the Miller Group of ten claims a portion of the contact has been sluiced. A ditch is being opened from Miller creek to the crest of the divide at an elevation of about 2,760 feet, for the purpose of sluicing the available auriferous residual material clinging to the slopes on both sides of the spur.

Although Diller does not mention the fact, it is evident from his map that the Bacon group is on the Miller creek side of the divide, while the Miller group is on the Baby Foot slope, about a mile southwest of the Bacon claims.

BADGER GOLD MINING AND MILLING COMPANY (gold, silver and lead) (California corporation) SUSANVILLE DISTRICT GRANT COUNTY

Local name, Badger mine.

The Susanville Commercial Company owns almost exclusive control of the Badger Gold Mining and Milling Company, the former being one of the F. W. Bradley interests.

The Badger mine is located in Sec. 8, T. 10 S., R. 33 E., on the south side of Elk creek, in the lower part of the present town of Susanville.

The country rock is slate, some of it so siliceous that it might be called quartzite. The vein strikes a little north of east and dips 60 to 70° south. The shaft is down 900 feet below the collar of the shaft and 400 feet below a 1600-foot crosscut driven from Elk creek. It is said that the principal ore shoot is 190 feet long and from 1 to 20 feet wide, with 10 feet of a massive irregular mixture of pyrite, arsenopyrite, zinc blende, galena, chalcopyrite and tetrahedrite, containing high values in silver and gold. It is also stated that both sorting and milling were practiced. Sorted ore was kept above \$150 per ton. It is also said that the ore has been only partially stoped between the fifth and seventh levels, and has not been touched between the seventh and ninth.

This vein was discovered in the late '60s, and in the early '70s free gold was extracted in an arrastre from the decomposed croppings, which yielded about \$25 per ton. Later on a 10-stamp mill, with concentrators, was built, but there was not a high percentage of extraction.

As a result of litigation, in which the Stockton Mining Company was the complainant, a decree (November, 1905) in the Circuit Court of the United States for the District of Oregon was handed down, which required that the Badger Mining Company, in order to mine on their ore body, which at depth is within the vertical side lines of the Stockton Mining Company's ground, must deposit with the clerk of the court all net proceeds received from the sale of ores, pending litigation to determine the ownership of the ore so

mined. Following this order the mine was closed and nothing has been done to reopen the litigation since the date of the order.

BAILEY GULCH MINING AND MILLING COMPANY GALICE DIST. JOSEPHINE CO.

Office: Galice, Oregon. G. S. Smith, Pres.; D. J. Miller, Sec.-Treas., both of Philadelphia, Pa. Capital stock, \$500,000; par value \$1.00; all subscribed, issued and paid up. (1912 report).

For description see "Golden Wedge Mine."

BAISLEY-ELKHORN MINE (gold) ROCK CREEK DISTRICT BAKER COUNTY

This mine is situated on the east end of a low spur from the divide between Pine and Rock creeks, near the head of Elkhorn gulch, a tributary of Pine creek valley, in Sec. 20, T. 8 S., R. 38 E., 18 miles west of Baker. According to Lindgren, it was discovered in 1882 and a mill was erected in 1889. The mine was sold in 1897 to the Eastern Gold Mining Company for \$60,000, and, when consolidated later with the adjoining property, the Robbins-Elkhorn, was operated by the United Elkhorn Mines Company. It was closed down in October, 1907, and in September, 1914, was inaccessible. The following description is based upon reports and maps submitted by the present owner, Mr. William Pollman, of Baker, and supplemented by an examination of the surface.

The following statement of production may be incomplete, as there is no record of production from 1901 to 1905:

Prior to Jan. 1, 1898.....	\$342,861.07
1898 to Dec. 1, 1900, 26,095 tons ore (bullion).....	84,591.64
3,759 tons concentrates.....	239,529.84
472 tons shipped @ \$45.03 per ton.....	21,254.04
1905, 20,000 tons crude ore, yielding 3000 tons concentrates.....	210,000.00
1907, 7,680 tons crude ore, yielding 1280 tons concentrates.....	38,481.00
1912, (Small production).....	?

Total\$936,717.59

The mine was operated through a crosscut tunnel 626 feet long, which meets the vein at a point 265 feet below the outcrop. The shoot above the tunnel was exhausted before 1897 and deeper operations were continued through a shaft on the vein 400 feet deep.

The course of the vein is broadly an arc convex to the southeast, with an average strike over its known extent of N. 42° E.; the dip is nearly vertical.

Lindgren gives the following description of the vein:

The vein matter is confined between two well-defined walls, covered with polished gouge, but within these there are often subordinate fissures. Striations dipping 20° to 40° N.E. were observed on the walls. Sometimes the whole width of the vein is an altered diorite of small assay values. In the pay shoot the width is from 2 to 10 feet, many gradually fading seams running out on the north side. The ore streak on this width is a soft mixture of coarse sulphides with much crushed diorite and occasional streaks of quartz which show comb structure; in one place a 2-foot ore streak was adjoined by 10 inches of white barren quartz * * *. On the 180-foot level, 700 feet south of the shaft, the vein which otherwise is entirely contained in diorite, gives sign of splitting up into stringers, and a black fine-grained hornfels appears, which is simply an argillite altered by the heat of the diorite cooling close to it. * * *

The gangue is normal vein quartz with some calcite. In general character the ore is soft and rich in sulphurets, concentrating in the proportion of 7:1. The sulphides, in order of their abundance, are pyrite, black zinc blende, galena, and chalcopyrite, all of which occur in irregular intergrowth with the gangue, the pyrite alone being sometimes crystallized. Ruby silver is occasionally found. The chief values of the ore are in gold which is partly—up to 25 per cent—free amalgamating, occurring in pyrite or intergrown with black zinc blende and calcite in form of pale yellow wires. Some of the brown zinc blende contains 160 ounces silver per ton and no gold, while some of the mentioned black blende contains much gold and no silver. The bullion is 700 to 750 fine. * * * Along with the ore is found some diorite converted to a white mass of sericite, calcite, and with small crystals of pyrite. This metasomatic product as a rule contains no pay.

The last material to be taken from the mine, reported to be from the fourth level in the shaft, shows lenticular masses of gray and milky granular quartz containing disseminated pyrite, blende and chalcopyrite, with which is associated a small amount of pyrrhotite and arsenopyrite. The quartz contains small roughly lenticular aggregates of gray sericite. The associations indicate the replacement by quartz and associated sulphide minerals of the granodiorite which forms the walls. Blocks of granodiorite show, on a small scale, the transition from fresh rock to a zone of sericitic rock along fractures that contain all of the minerals characteristic of the vein. Locally, terminated quartz crystals penetrate lenticular masses of calcite in such a manner as to show that calcite has filled a quartz-lined vug and was probably the last mineral to be deposited.

The vein is reported to be traceable for 1800 feet on the surface and has been explored for 1400 feet on the second level from the shaft. Within this distance two shoots have been found, the Baisley-Elkhorn, 850 feet long, and the Robbins-Elkhorn, 150 feet long. Both appear to have pitched directly down the dip of the vein. Though the former was stoped continuously to the third level 515 feet below the outcrop, the fourth level, 150 feet lower, appears to have found only sporadic masses of ore, which is thought by those who have observed the lower level to be the upper portions of lower shoots of ore. Plans are (1916) under consideration to drive a tunnel about 1 mile long to cut the vein 1500 feet below the outcrop and 625 feet below the lowest level to prospect these supposed shoots.

The ore produced during several periods has shown a wide range in value. Over the period 1898-1900 the extraction from 26,095 tons averaged \$12.30 per ton, omitting 472 tons of shipping ore which yielded an average of \$45.03 per ton. It would appear that most if not all of this came from the zones between the tunnel and second level in the shaft. The value for 1905 and 1907 was \$7 and \$5, respectively.

BAKER AND HERRIMAN PROSPECT (gold) BAKER DISTRICT BAKER COUNTY

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

BAKER AND MALHEUR OIL COMPANY MALHEUR COUNTY

Office: 614 Chamber of Commerce Bldg., Portland, Oregon. Paul S. Reeder, Pres.; Albert Backus, Sec.; J. W. Heiny, Treas., all of Portland, Oregon. Capital stock, \$1,000,000; par value \$1.00; \$843,455 subscribed, \$825,805 issued and paid up. (1913 report). Dissolved by proclamation in January, 1917.

BAKER MINES COMPANY (gold) CORNUCOPIA DISTRICT BAKER COUNTY

Local name: "Last Chance Mine."

Office: Cornucopia, Oregon. R. M. Betts, Pres.; Paul W. Gaebelein, Sec., both of Cornucopia; Jos. B. Thomas, Treas., 132 E. 19th St., New York. Capital stock, \$800,000; par value \$10; \$518,500 capital stock subscribed, issued and paid up. (1916 report).

The following statement is from a previous report published by the Bureau in 1914:

Geology.—The Last Chance is the next vein of importance to the westward and higher up the mountain from the Union-Companion vein. The outcrop at the principal workings is at about 7000 feet, or 1000 feet above the principal

outcrop of the Union-Companion vein. Horizontally the Last Chance vein is about 3100 feet from the Union-Companion vein.

The wallrock, in part, is granodiorite, similar to that found at the Union-Companion mine. In other places it is a dense dark green rock that was probably once an argillaceous sediment laid down between the old surface flows.

The striking point of difference between this vein and the others of the district is its location on both sides of an aplite dike that is older than the vein. This aplite dike, locally known as the "Forest dike," is probably the same as found alongside the vein in the Mayflower mine on the other side of the mountain.

Sufficient manganese oxide is present in the surface waters to precipitate on the joints and seams of the dike, black tree-like forms so characteristic of this element. These tree-like forms, which the mineralogist calls dendritic manganese, has caused the prospector to give this dike the apt name of "Forest dike." This dike has a greater amount of dark minerals than ordinarily found in aplite. Basalt dikes also break across both the vein and the aplite dike.

The Vein.—The strike of the vein is N. 20° E. and the dip 45° W. Massive white quartz, through which pyrite with a little chalcopyrite and zincblende are irregularly scattered, makes up the vein. Whether the walls of the vein are of schist, granodiorite or aplite, they are bleached and sericitized, such as is ordinarily found next to any vein made by ascending hot waters.

The stopping width of the Last Chance vein probably averages at least five feet of higher average grade of ore than found so far in the other properties.

It seems probable that the refissuring in the general plane in which the aplite dike had been placed broke the aplite dike in the same way that the Union vein was broken to receive the basalt dike. On the Union-Companion ground the vein was broken to receive a dike. On the Last Chance ground the dike was broken to receive a vein.

Further similarity probably exists in that the refissuring alternated from wall to wall of the dike like the refissuring of the Union-Companion quartz vein. Doubtless at some points it may have loosened the dike along both walls and shattered it in many places. Similarity as to fracturing is pronounced. Here the analogy ceases.

The molten basalt intrusion into the Union-Companion vein cooled rather quickly, but even if it should not have done so, it nevertheless would have had but little effect on the simple quartz of the vein, always slow to alter. Alteration of the walls of the basalt dike are practically negligible. But in the Last Chance vein they are altered, whether it be schist, greenstone, granodiorite or aplite dike. All the rocks except the crosscutting basalt dike are considerably altered next to the vein. The aplite dike especially so, because it was a thin sheet between two walls subjected to compression and movement. This together with its being very fine grained, caused more shattering, therefore more area within it to be subjected to the action of hot ascending waters.

The aplite dike and the Last Chance vein are seen on the surface to be probably several claims in length. The stope lengths are about 300 feet in a development of the vein of not much more than 600 feet with much of the latter distance unfruitful because of a failure to determine the form of a thick irregular basalt dike that cuts the vein. Doubtless when the interrupted vein is found on the other side a good shoot of ore will be discovered. The considerable horizontal length, the good width of the vein, the length of the stopes, the persistence of fair values with frequent bodies of high values, the nature of mineralization of the vein, and the pronounced alteration of the walls

all indicate the likelihood of a continuation of shoots of ore to considerable depths.

Mine Development.—We do not possess maps of the mine showing its present development. The following description shows less than the present amount of work done, although it gives a fairly good idea of the development accomplished. This is a description of the work completed up to 1903.

The Last Chance vein is developed by an adit tunnel, driven south on the vein for a length of 690 feet. This tunnel undercuts the vein at a maximum depth below the surface, on its dip of 500 feet. At a point in the tunnel 105 feet from its mouth, a shaft is sunk on the vein to a depth of 265 feet. From this shaft, two levels are run on the vein, at a depth of 100 feet, level drives are run north and south on the vein 270 feet and 180 feet respectively, and at a depth of 200 feet level drives are run on the vein 375 feet and 270 feet respectively. From the north level drives a cross-cut 296 feet is run to the surface, for the purpose of drainage and ventilation.

Since that time this property, until 1914 a part of the Cornucopia Mines, was operated only in a small way by the company or by leasers. These operations were spasmodic and did not extend the development to any great degree. The last work, which was done by leasers milling their ores at the Union-Companion mill, was successful in finding ore of sufficient grade to stand the heavy expense of wagon transportation to the mill. Unfortunately for them, their lease expired November 1, 1913, which came too soon after the finding of the rich ore to get more than a small part of it to the mill to reap the profit for themselves.

The finding of larger and better grades of ore than were already known to exist encouraged certain western and New York persons, largely of the same group already in the Cornucopia Mines Company, to form a strong leasing company to take over the Last Chance vein. This new company, with John M. Baker as general manager, is called the Baker Mines Company. It perfected its organization last winter and arranged for the financing of the development work in the mine, the erection of a surface plant at the mine, an aerial tramway, a water power plant, and a 20-stamp mill with a sand and slime cyanide plant. This work was started early in the spring and late in October they commenced to mill their ore.

They have also acquired claims adjoining them in the Bonanza basin, upon which it is said the development is decidedly encouraging.

Aerial Tramway.—The ore is conveyed to the mill by means of a Bleichert aerial tramway 5500 feet long. The difference in elevation between the loading and discharge terminals is 1675 feet. There are only two intermediate supports for the cable. The upper span has two locked-coil track cables 616 feet long, one is $1\frac{1}{8}$ inches in diameter and the other $\frac{7}{8}$ -inch. The middle span has two similar cables, each 1410 feet long; while the third span has two cables 3210 feet long of $1\frac{3}{8}$ inches and $1\frac{1}{8}$ inches in diameter, respectively. This span has a clearance of over 500 feet above the bottom of the gulch. The traction rope used is made of special cast steel. This tramway when operated at a speed of 500 feet per minute has a capacity of 15 tons of ore per hour.

Mill Practice and Flowsheet.—The ore is dumped from tram buckets onto grizzlies, the undersize falling into a bin and the oversize passing to a No. 3 Austin gyratory crusher. Twenty stamps are employed in crushing to "so-called" 25-mesh. About 25 per cent of the values are recovered on the plates, which are eight feet in length and have a slope of 2 inches to the foot. After passing through a mercury trap the pulp is treated by a Dorr classifier. The sands are leached in 30-foot vats, the slimes passing to a 30-foot Dorr thickener, and from thence to two 20x16 Dorr agitators. The slime is again thickened in a 20-foot Dorr thickener, diluted and again thickened in a 30-foot Dorr thickener. The reason for the use of two thickeners is because of the necessity of obtaining a large amount of dilution owing to the high value of the slimes. From the last thickener the pulp goes to a 20x16 Dorr agitator used as a stock tank for a Portland filter. The precipitation is with zinc-dust and Merrill zinc presses.

Since the above was written the mine has been producing steadily and profitably. Development has been continued at the mine with a satisfactory

increase in proven ore. There has also been substantial additions to and improvements at the surface plants at both mine and mill. Frank S. Baillie, who was the managing engineer of the Columbia mine for so many years, succeeded John M. Baker as manager of the Baker mine on August 1, 1916, where he will doubtless use the same degree of business and engineering skill which kept the Columbia mine in profitable operation for so many years.

BALD MOUNTAIN MINING COMPANY (Maine corp.) (gold)
CRACKER CREEK DISTRICT

BAKER COUNTY

Local name, Bald Mountain mine.

This company filed articles of incorporation March, 1916, with a capital stock of \$100,000. George N. Putnam, Pres., 35 Congress St., Boston, Mass.; A. D. Sargent, Sec.-Treas., 295 Central St., Lowell, Mass.; Chas. J. Wier, Vice-Pres., 103 Central St., Lowell, Mass.; Chas. A. Johns, Yeon Bldg, Portland, Ore., attorney-in-fact.

The Bald Mountain mine is on the northeast extension of the Ibex vein, in Sec. 3, T. 9 S., R. 36 E., and is said to be similar to it in every way, with the exception that there is a greater proportion of quartz to argillite between the walls. Since the mill was built in 1901 and operated for 4 months, very little has been done upon the property.

In March, 1916, the mine was reported bought and made a part of the Ibex mine. This vein can best be developed and operated from the east side, as a greater depth can be secured by tunnel, and it will also avoid a long grade over the divide.

BALLARD GROUP (copper)

HOMESTEAD DISTRICT

BAKER COUNTY

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

BALTIMORE GOLD MINING COMPANY **BOHEMIA DISTRICT** **LANE COUNTY**

Office: Cottage Grove, Oregon. Ed Jenks, Cottage Grove, Pres.; F. J. Hard, Eugene, Sec.-Treas. Capital stock, \$2,000,000; par value \$1.00; all subscribed, issued and paid up. (1916 report). Company owns 9 claims.

BANFIELD MINE (copper)

DREW CREEK DISTRICT

DOUGLAS COUNTY

Property consists of 9 claims, located in southern Douglas county, about 35 miles southeast of Riddle and 4 miles south of Drew postoffice, at the head of Drew creek, one of the branches of the south fork of the Umpqua river, in Sec. 34, T. 31 S., R. 2 W. There is a good wagon road to the mine up the South Umpqua by way of Drew. The elevation is 2400 feet.

The property has had a great deal of development work done, several tunnels having been driven aggregating several thousand feet. It is on a schist belt several hundred feet wide. The general direction of shearing movement was north-south and dipping steeply to the east.

The minerals are chalcopryite and pyrite irregularly distributed through the schist in grains and lens-shaped masses, varying from pea size to an inch or more in thickness, showing by their shape and occurrence that they were formed either previous to or during the movement which produced the schist.

No definite information concerning the average copper content in the workings is available. The occurrence is such as to suggest the advisability of systematically drilling the schist to determine the extent of low grade ore.

BANNER HILL MINING COMPANY**DOUGLAS COUNTY**

Office: 506-7 Stock Exchange Bldg., Portland, Ore. J. C. Ritter, Pres.; W. A. Kuykendall, Sec.; Frank Fisher, Treas., all of Portland, Ore. Capital stock, \$50,000; par value \$1.00; all subscribed, issued and paid up. (1915 report). Company owns the Banner Hill quartz claims and 6 placer claims.

BANZETTE MINE (gold)**GREENHORN DISTRICT****BAKER COUNTY**

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 chalcopryrite, and some high grade gold ore. This property is idle.

BARR PROPERTY**OPHIR DISTRICT****CURRY COUNTY**

See "Ink & Barr" property.

BARRON MINE (gold, etc.)**ASHLAND DISTRICT****JACKSON COUNTY**

The only important deep mine in the Ashland district which is not chiefly valuable for its gold is the Alton or Barron mine, which contains much zinc and some lead, copper and silver. This mine is situated about 3 miles north of Soda Springs on a branch of Emigrant creek, locally known as Sampson creek. It is opened by a crosscut entry extending N. 50° E. about 210 feet to the vein on which drifts are driven both ways, that to the eastward for 235 feet, and that to the westward about 270 feet. The vein material is about 16 feet thick where it is cut by the crosscut, which extends beyond about 80 feet. The vein contains much quartz, fault gouge and sulphides of iron and zinc, with occasional stibnite and realgar. It occupies a fault with a series of volcanic flows on the northeast side and a massive igneous rock (probably auganite) on the southwest or footwall side. The vein strikes S. 55° E. and dips about 80° N. E.; about 30 feet southeast of the crosscut it is cut off at a sharp angle by a vein which strikes S. 25° E. and dips about 80° N. E. The later vein is said to contain stibnite along the footwall and realgar along the hanging wall. The intersection of the two veins seems to pitch steeply to the southeast. A selected sample of ore from this mine is reported to have yielded 44 per cent of zinc, 29 per cent of sulphur, 14 per cent of silica, 5 per cent of lead, 1.5 per cent of copper, 1.4 per cent of iron, 1 per cent of alumina, 0.6 per cent of manganese, 268 ounces of silver, 14.20 ounces of gold, and a trace of antimony. But 60 tons of ore sold for about \$530. The minerals observed in this ore include quartz, calcite, sphalerite, pyrite, galena, chalcopryrite, stibnite, realgar, malachite, native gold, wire silver, gypsum and probably pyrargyrite. The tunnel reaches a depth said to be 200 feet; a winze extends 50 feet deeper, and a raise runs to the surface. Near the surface the ore is richer and much thicker, perhaps due to mineralization between the two veins. Very little stoping has been done at this mine.

BATTLE BAR PLACERS**MULE CREEK DISTRICT****CURRY COUNTY**

Diller describes this property as follows:

At Battle Bar, on the left bank of Rogue river a little above the mouth of Ditch creek, a terrace 20 to 25 feet above the river is capped by gravel that has been tested by a small placer and said to yield good values. I saw it only across the river, but the deposit appears to be similar to that of Winkle Bar a mile farther down the river.

BEAVER HILL COAL COMPANY (California corporation) (coal)**COOS BAY DISTRICT****COOS COUNTY**

Local name, Beaver Hill mine.

Office: 870 Market St., San Francisco. W. R. Scott, Pres.; G. L. King, Sec.; W. F. Ingram, Treas., all of San Francisco; A. J. Sherwood, statutory agent, Coquille, Oregon; W. F. Miller, agent, Marshfield, Oregon. Capital stock, \$500,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

Located at Beaver Hill, about 12 miles south of the town of Marshfield.

This company is controlled by the Southern Pacific Railway, and property is under the management of Mr. L. A. Whereat.

This mine has been a steady producer of coal for many years. The bed at present being mined yields about 5 feet of coal, having two partings of clay material, dividing the coal bed into three seams. The lower seam is about 2 feet thick, the middle seam some 30 inches thick, while the upper seam usually runs about 8 inches and is often left as the roof. The coal bed dips to the southeast nearly 30° at the collar of the shaft, becoming flatter as one goes down, until it is less than 20° at a distance of a little more than 3000 feet down the incline.

Development work of earlier years in this mine was confined to sections within 400 to 500 feet of the surface. Present development work, however, is several hundred feet farther into the ground, the incline shaft having been driven to the limits of the property and the coal mined by a sort of retreat-ing system.

The coal is a good grade of sub-bituminous variety, the analysis of which is as follows:

	Total moisture	Volatile matter	Fixed carbon	Ash	Sulphur	Air dry- ing loss	Heat value BTU
Mine sample	16.10	31.10	39.63	13.17	.81	8.1	9031
Moisture free.....	.....	37.07	47.23	15.70	.97	.....	10764
Moisture and ash free...	.....	43.97	56.03	.....	1.15	.....	12769

The mine has some good equipment operated by steam power, consisting of an automatic tippie of the latest improved type, screen, sorting table, Sullivan washer and trommel. The plant has a capacity of about 150 tons per day. The company employs about 35 men, with an average production of approximately 1600 tons of coal per month. It produces 3 grades of coal—lump, nut and pea. The pea coal is practically all consumed at the mine for power purposes and represents about 30 per cent of the total output. The mine is also equipped with a ventilating fan of the suction type 16 feet in diameter and 4 feet wide, making 125 revolutions per minute, a large steam hoist and two 100-kilowatt generators for the lighting system.

BEAVIS MAY OIL COMPANY

WASCO COUNTY

Office: 617 Medical Bldg., Portland, Oregon. Dr. J. B. Keefer, Pres.; Z. N. Trine, Sec.; George A. Beavis, Treas., all of 617 Medical Bldg., Portland, Oregon. Capital stock, \$125,000; par value \$1.00; all subscribed and paid up; issued, \$106,187. (1916 report.) \$5576.94 expended in development in 1915.

BEE HIVE MINING COMPANY (gold) GOLD HILL DISTRICT JACKSON COUNTY

Local name, Bill Nye mine.

Office: Gold Hill, Oregon. George P. Blanchin, 37 Rue Godot de Mauroy, Paris, France, Pres.; Frank C. Bellamy, Gold Hill, Oregon, Sec.; Rene Bordier, Seine, France, Treas. Capital stock, \$500,000; par value \$1.00; \$250,000 sub-scribed and paid up, none issued. (1916 report).

This company owns 4 claims, the Bill Nye, Bliss, Bliss Extension and Mon-tana, in Sec. 4, T. 37 S., R. 3 W., 3 miles south of Gold Hill on Galls creek, about a mile nearly due south of the Braden mine. It is opened by several adits and a vertical shaft. A considerably anamorphosed impure quartzite is a common country rock; it contains abundant fine grained quartz in patches and layers, and abundant green hornblende and brown biotite with some untwinned interstitial and enclosing plagioclase and a little magnetite; the texture is globulitic to irregular. The vein on which the shaft is located strikes N. 52° E. and is nearly vertical; it contains about 2 feet of quartz. The main adit is about 400 feet long; it is on small veins and stringers near

the portal, but crosscuts to the northwest open a somewhat larger vein of quartz which strikes S. 60° E. and dips 80° N. E. The country rock is pyritized and somewhat silicified. In the Bliss adit a vein striking N. 75° E. is cut off about 80 feet from the portal by a fault which strikes N. 30° E. and dips about 40° S. E. Another fault in the same working on a level 80 feet higher produces a horizontal offset of 6 feet to the north, the fault striking N. 14° W. and dipping 55° E., as shown in the illustration.

There is a 5-stamp mill upon the property, but the mine has been idle since August, 1914.

BEESON MINE (coal)**ASHLAND DISTRICT****JACKSON COUNTY**

In Sec. 16, T. 38 S., R. 1 E., a coal seam has been opened by Emmett Beeson, of Talent, by means of a slope or incline shaft following the coal nearly on its dip. This coal outcrops in a ravine at the foot of a sandstone cliff at an elevation of about 2600 feet. Fossil impressions of leaves were collected from shaly sandstone at an elevation of about 3050 feet near the top of the cliff a little south of east of the coal seam. The sandstone strikes about S. 45° E. and dips about 25° N. E. at the place where the fossils are found. The coal seam has a strike of N. 53° W. and a dip of about 16° N. E. The slope opening this coal discloses a fault at 70 feet from the portal, which strikes N. 10° W. and dips about 62° E. The hanging wall of the fault is displaced vertically downward about 6 feet. At about 120 feet from the portal the coal seam is narrowed to about 3 inches by the doming up of the floor; at the breast, about 130 feet from the portal, the coal is again nearly 2 feet thick.

The section at this outcrop follows:

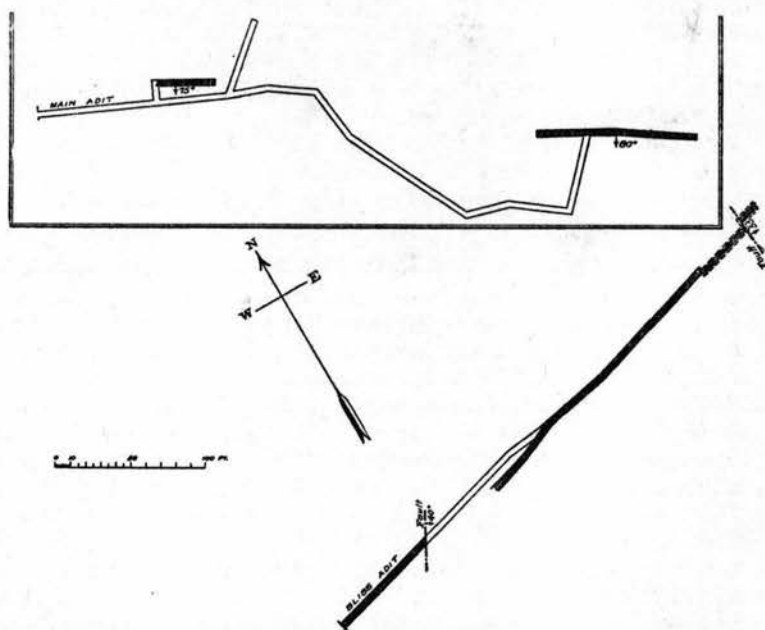
Section at Beeson's Slope in Sec. 16-38-1 E.

	Feet	Inches
Feldspathic sandstone	10	
Shaly sandstone with fossil leaves.....		6-8
Feldspathic conglomerate sandstone.....	400	
Covered	5	
Feldspathic conglomerate sandstone.....	6	
Fine grained sandstone		2-4
Coal		1
Coal and coaly shale	1	3
Coal		3
Fine grained sandstone.....	8	
Feldspathic conglomeratic sandstone.....	42	
Coarse quartzose conglomerate.....	10	
Feldspathic conglomeratic sandstone.....	20	

According to J. S. Diller, several coal seams have been opened by D. P. Greninger by means of shallow workings about 4 miles north of Ashland. He states that the coal seams increase in thickness and improve in quality to the northeast, although the openings are not sufficiently extensive to determine their value. No lavas nor faults were disclosed by these workings, which furnished a few tons of coal for local use.

There is a coal prospect on W. C. Butler's ranch in T. 38 N., R. 1 E.; it is opened by an adit, now caved, said to be about 200 feet long. The croppings show thin seams of coal in a shale and shaly sandstone. A few impressions of leaves were observed in the shale, but they were too imperfect to be useful in determining the age of the beds.

Summarizing these observations, it appears that coal seams are found more or less continuously from northwest to southeast across the Ashland district. There are several seams of coal, of thicknesses varying from an inch to several feet. The coal improves in quality and quantity down the dip, which is toward the northeast. It is not now in use, but by means of further development it may become a source of fuel for local use and perhaps a source of power through its use in making gas.



Bill Nye mine, main adit and Bliss adit

BELMONT MINE (gold)**GREENHORN DISTRICT****BAKER COUNTY**

A high grade gold vein near Greenhorn, owned by Gilkey and Kershaw, which has attracted much notice during the last 2 years because of its rich pockets.

BENTON GROUP (gold)**GALICE DISTRICT****JOSEPHINE COUNTY**

The Benton group consists of 8 claims, situated on Drain creek, a branch of Whiskey creek, in T. 33 S., R. 8 W., near Mount Reuben. There is a good camp of half a dozen buildings, at the mouth of Drain creek, which are still in good repair, although the last work done here was in 1905.

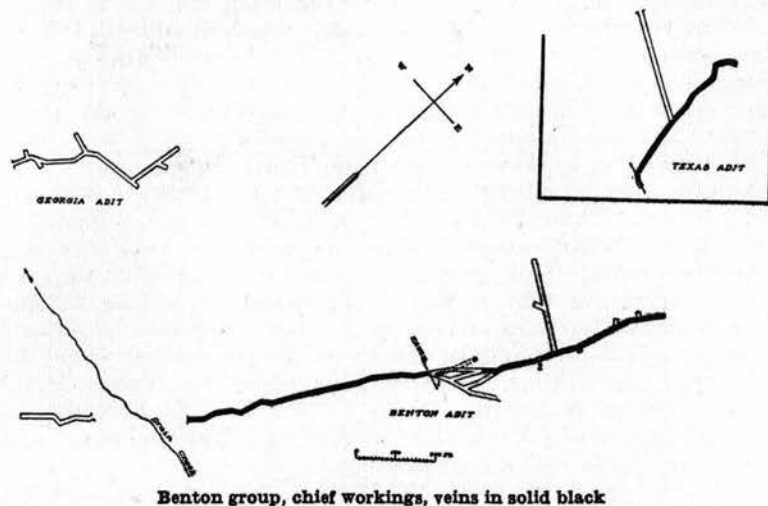
It is now owned by L. A. Lewis, of Portland. It is connected with Glendale, via Reuben Spur, by a good wagon road.

The main adit is a drift following a vein for 600 feet to a fault, which strikes N. 70° W. and dips 85° S.; about 100 feet farther on the adit picks up a vein again, which it follows for about 500 feet. This vein is also opened by an upper adit for about 800 feet. The ore has not been removed. Assays said to have been made by Mr. Bishop, former superintendent of the Greenback mine, are reported as follows:

	Per ton
Upper adit, 40 samples taken.	
Average value of ore from portal to raise 2.....	\$5.32
Average value of ore from raise 2 to breast.....	4.42
Main Benton adit, 127 samples taken.	
Average value of 34 samples between portal and point 47 feet N. E. of rise 1....	2.75
Average value of 43 samples between same point and main crosscut.....	4.30
Average value of 50 samples between main crosscut and breast.....	1.80

The Texas adit of the Benton group crosscuts 300 feet to the vein, which is opened by a drift each way; to the south it is cut off by a fault (dipping 50° northerly) about 150 feet from the crosscut entry; to the north it is displaced slightly by another fault about 50 feet from the crosscut. While the latter fault causes little displacement, it twists the hanging wall so much as to locally cause reversal of the dip of the vein; normally this vein dips about 40° east, locally it dips west. The strike of the fault is not shown in the drawing,

because it is somewhat indeterminate; in one place it seems to strike N. 47° W. and dip about 60° N. E. Near and for some distance south of this fault the vein has 1 to 3 feet of solid quartz; northward a much smaller vein is



exposed. The raise shown in the drawing inclines upward at an angle of 30° and reaches the surface about 100 feet above the adit level. The country rock of this adit is tonalite.

The Georgia adit of the Benton group is quite irregular, as shown in the drawing, and discloses no important vein. Its longest straight course is along a sheared zone about 3 feet wide showing very little quartz.

Tonalite (locally called "gabbro") is present in this region, not only in the Texas adit, but also at the face of the long crosscut (called "Georgia crosscut") from the main Benton adit, where the rock is sheared and contains quartz stringers running in various directions. The minerals present include abundant plagioclase and quartz with some chlorite, epidote, rutile, calcite, sericite and pyrite.

BEN HARRISON MINE (gold and silver) GREENHORN DISTRICT GRANT COUNTY

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 feldspars 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 stoped 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 sericitized 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. 3° 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 per cent 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 silicified 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 locally called 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 pyrrargyrite.

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 per cent, while the silver content has fourteen times as much in one as in the other.

This vein was formed by hot waters coming directly from the interior of the intrusion. This hot water, using the fissure as a channel, percolated through the brecciated rock in it, which at the beginning was unaltered. The moderately high temperature ascending water, together with the material in solution, brought directly from deep-seated sources or extracted from the deeper parts of the channel, possessed a vigorous altering effect upon the fragments of granodiorite and the wall rock. They kaolinized the feldspars and the ferro-magnesian silicates were broken down so that now we have the softened badly altered fragments and wall rocks. At the same time that the hot ascending waters were metamorphosing the wall rock and brecciated granodiorite in the vein, it was also depositing the quartz in between the fragments and silicifying their interior, and was also bringing iron, antimony, silver, some copper and zinc, and gold in solution. Lessened temperature and pressure, together with changes in the nature of the solution itself when it reached the upper few thousand feet of the vein, caused a deposition in the vein of the gold and various other metals in their present form as sulphides.

This locality is undoubtedly a glaciated basin. The oxidation in the vein is very shallow and every appearance of the hard silver ore in quartz leads one to conclude that this ore is a primary and not a secondary ore of silver, and therefore the development of this silver-gold ore is not in a zone of secondary enrichment which will, a short distance below the lowest level, become lean in silver values. We conclude, rather, that any changes in the silver content below the 600-foot level will be due to some other factor in ore deposition than to the leaching of silver from the upper part of the vein to deposit it below, forming what is called downward sulphide enrichment.

The mine was equipped with a gyratory crusher, 20 stamps, a tube mill, Richard-Jenney classifiers and Isbell vanners. The concentrates were hauled to Whitney at a cost of \$8 per ton when the roads were good, but in the fall and spring the roads are almost impassable for heavy traffic, so that the five or six tons of concentrates produced daily accumulated too rapidly during those periods.

Although the pulp was carefully classified and the product of the first two spigots returned to the tube mill for regrinding, nevertheless the vanners had difficulty in maintaining a 75 per cent extraction. The difficulties in getting the concentrates to the railroad, the high cost of transportation and smelting, together with the loss in the tailings of \$2.50 to \$3.00 per ton, caused the owners to await the results of a series of tests made by Manager Walter C. Fellows in order to work out an efficient process of extracting the values on the ground.

Cyanide and flotation tests were conducted for about two years before flotation cells of special design were adopted. The cells are reported to get

a 90 per cent combined extraction of the gold and silver. There is also a gratifying increase in the value of the concentrates per ton.

The final tests with a 50-ton capacity experimental plant were conducted during the summer of 1916 and the installation completed about December 1, 1916, for a capacity of about 120 tons per day.

BERTHA CLAIM (gold)

GOLD HILL DISTRICT

JACKSON COUNTY

The Bertha claim (locally known as the "Bertha" pocket), 8 miles southwest of Gold Hill, is in the S. E. $\frac{1}{4}$ Sec. 12, T. 37 S., R. 4 W., on the left fork of Foots creek, at an elevation of 1600 feet by barometer. The country rocks here are impure banded and locally schistose quartzites, some limestone, and apparently small intrusions of an andesitic type. The workings are small and now caved.

BERRY'S PROSPECT (iron)

COLLIER CREEK DISTRICT

CURRY COUNTY

The only iron ore found in this section which can properly be classed as an impregnation deposit occurs on the ridge running easterly from Horse Sign butte between Horse Sign and Collier creeks, in the southwest corner of T. 36 S., R. 11 W. The deposit belongs to Frank Berry, of Agness, and is about 2 miles east of Horse Sign butte, at an elevation of about 3050 feet. The iron ore is magnetite, and it occurs as an impregnation in Myrtle sandstone between two greenstone dikes. The contacts of the sandstone and igneous rocks are not well exposed, so it is impossible to ascertain the width of the impregnated sandstone; but little pits scattered here and there over the surface indicate that it may be as much as 50 to 100 feet wide, and that it runs for some distance down both sides of the ridge. There seems no doubt that a large body of ore could be developed here. The beds appear to strike about N. 20° E., and to dip 51° to the northwest.

The weathered ore looks like a highly jointed brown sandstone, but its great weight at once suggests the presence of metallic material; and the use of a land-lens shows that the pores between the sand grains are completely filled with magnetite. So thoroughly impregnated is the sandstone that an average sample proved to contain 51.45 per cent of iron. Phosphorus, sulphur, titanium, arsenic and copper are entirely absent.

It seems likely that this deposit originated by deposition from solutions developed in the neighboring serpentine during the serpentinization process. Such solutions would normally have led to the formation of one or more masses of the boulder type of iron deposits in the serpentine itself, but accidentally finding their way to the border of the serpentine, they worked outward through the greenstone and impregnated the neighboring sandstone.

Although the iron ore as mined would be of rather low grade, it could readily be concentrated magnetically so as materially to increase its purity. As there is almost unlimited water power at no great distance, this would not be an expensive operation.

The absence of detrimental elements, the apparently large size of the ore body, and the comparative ease with which it could be mined, combine to make this deposit well worthy of a careful investigation, and of exploitation if transportation difficulties can be overcome.

BLACK BEAR CLAIM (gold)

ILLINOIS RIVER DIST.

JOSEPHINE COUNTY

Concerning this property, Diller says:

The Black Bear claims, located on the ridge between Hoover Gulch and Fall creek, recently yielded some rich samples of free gold that attracted considerable attention. It is described as a well defined quartz ledge plainly traceable on the surface of the steep mountain slope. The ledge was opened at four different points. It extends northeast and southwest, and where the rich samples were taken it was not less than a foot thick.

BLACK BEAR MINE (gold)**GALICE DISTRICT****JOSEPHINE COUNTY**

The Black Bear mine is on the south fork of Rocky gulch, about 2½ miles northwest of Galice, at an elevation of about 1650 feet, as measured by barometer. It was formerly owned by the Black Bear Mining & Milling Company, but is now controlled by the Highland Improvement Company. The main adit is over 700 feet in length and follows a well defined fault for more than 500 feet, as seen in a drawing of the workings. The fault is marked by 12 to 20 inches of soft gouge which strikes about N. 15° E. and dips about 80° E. The ore consists of lenticular bodies of quartz with pyrite and greenstone, which are found on both sides of the fault gouge. No ore has been milled from the main adit, though about 4 tons of rich surface ore was mined from old workings above it. The shorter adit discloses a zone showing scattered quartz near the breast as well as stringers crossing the main course as shown; one is about 2 feet wide and strikes S. 45° E. with a dip of 70° S. W. The country rock is a hard amphibolite, schistose in places, and containing many small quartz stringers or lenses. One to two hundred yards southwest of the Black Bear adits the country rock is dunite (or cortlandite), consisting of granular olivine with patches of tremolite and antigorite and a sprinkling of magnetite. Diller states that at the Black Bear:

A vertical belt of quartz veinlets and kidneys 2½ feet in width runs nearly north and south. The ore, which is rich in pyrite, with some chalcopyrite, is scattered rather irregularly in the vein belt. Some of the ore is cut by shearing planes, on which the slickensided ore shows decided movement since the ore was deposited.

BLACK BUTTE QUICKSILVER MINING COMPANY (Washington corporation) (mercury)**LANE COUNTY**

Local name, Black Butte mine.

Office: New York Block, Seattle, Washington. John N. Powell, Seattle, Pres.; Marion T. Edwards, Seattle, Sec.; W. B. Dennis, Carlton, Oregon, attorney-in-fact and managing agent. Capital stock, \$5,000,000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company owns 1040 acres of patented land in Sec. 16 and parts of Secs. 9, 8 and 17, T. 23 S., R. 3 W., 17 miles by wagon road south from Cottage Grove, on the coast fork of the Willamette river.

In past years many thousand feet of development work has been done on a low grade cinnabar deposit in a brecciated shear zone in andesite. This mineralized zone in the 100, 200, 300 and 400-foot levels averages about 16 feet in width. The next development lower than the 400-foot level is the 900-foot level. The zone here is shown to be very much wider than on the upper levels. The volume of brecciated material in this level is many times greater than on the upper levels, which is probably the principal reason why the ore is generally lower grade than above. The rock in the shear zone is very much altered and has every appearance of having been leached by uprising hot water solutions.

The company at present employs 30 men. The ore is treated in a 40-ton capacity Scott retort, which has been considerably altered and improved in the past years by Mr. Dennis.

BLACK EAGLE MINING AND MILLING COMPANY (gold-copper)**NORTH SANTIAM DISTRICT****MARION COUNTY**

Local name, Black Eagle mine.

Office: Newberg, Oregon. W. M. Abbott, Pres., Gates, Oregon.; Mrs. Minnie W. Cooper, Sec.-Treas., Newberg, Oregon. Capital stock, \$1,000,000; par value \$1.00; amount subscribed, \$600,000; \$353,267 issued and paid up. (1916 report).

The property, consisting of 11 claims, is on the Little North fork of the Santiam river, in Secs. 23, 24 and 25, T. 8 S., R. 4 E., and is 13 miles by wagon road from Gates.

About 1000 feet of development work has been done on the vein on the main level, besides several smaller tunnels and open cuts. The vein contains gold, silver, copper and zinc. The copper in the form of chalcopyrite, malachite and chrysocolla, and the zinc as sphalerite. Considerable manganese and iron oxide is found in different places in the vein, and at one place in the vein is a vertical opening locally called a chimney, and claimed to be more than 100 feet deep, which is more or less circular in cross-section, with its walls lined several inches thick with crystals of calcite and siderite, which locally is thought to be zinc sulphide. This occurrence is somewhat unusual, but is of no importance commercially.

The property is equipped with a sawmill, power plant, bunk houses and a small poorly designed concentrating mill. It is reported locally that the assessment work was not done last year and that the property had been "jumped."

BLACK GOLD CHANNEL MINE (placer) GOLD HILL DIST. JACKSON COUNTY

The Black Gold Channel mine (8 miles southwest of Gold Hill) is on the left fork of Foothills creek in Sec. 12, T. 37 S., R. 4 W. It is leased at the present time. In the bank is exposed about 15 feet of unstratified gravels, coarsest below, and containing boulders up to 18 inches in diameter. There is very little fine material; the boulders, which are almost all of greenstone, are subangular to fairly well rounded. The large boulders are handled by a derrick. Two giants are used under a head of several hundred feet. The gravels are forced upward for 15 feet over an elevator, but the sluice takes the material 2½ feet above bed rock. The mine pit of the present workings has an area of 1½ acres. A large area down the stream has already been worked over. The bed rock is slate cut by dikes of greenstone. The strike of the slates is N. 10° E.; distinct joints run about N. 70° W. Numerous small veins are present, and have a general northeast-southwest direction. (Kay—U. S. G. S. Bull. 380, p. 65, 1909.)

BLACK JACK PROPERTY (gold) GALICE DISTRICT JOSEPHINE COUNTY

The Black Jack group is on Quartz creek, not far from the eastern contact of the Peavine serpentine belt. The ore is free milling and between \$6000 and \$7000 in gold was won from a pocket by hand mortaring.

BLANCO or MADDEN MINE (placer) SIXES RIVER DISTRICT CURRY COUNTY

Diller describes this mine as follows:

The Blanco mine is about midway between Port Orford and Langlois, along the inner border of the coastal plain, at the foot of Madden butte, in the N. E. ¼ Sec. 4, T. 32 S., R. 15 W. When last seen it was operated by Mr. Cyrus Madden with about 500 feet of sluices and 7 burlap tables for catching the fine gold which constitutes about one-half the whole product. Platinum metals occur with the gold at this point and are about one-twentieth as abundant. The section exposed in the mine includes about 8 feet of wind-blown material next to the surface, below which lies from 12 to 20 feet of sand with small, black layers and some gravel. Some of the dark layers are coated by oxide of iron, and one of these is used as a bedrock on which to wash the overlying material. The real bedrock, which lies 10 feet below, is Cretaceous shale, but it is too low for drainage across the plain. The working season usually lasts six months, from November to May, and the mine from 1898 to 1900 yielded over \$1100 annually. The beds of sand and gravel of the ancient beach dip gently (10°) westward and overlap the older rocks at the base of Madden butte. The mine already covers an area of several acres, and there is reason to expect that it will continue profitable farther along the shore, especially at deeper levels, if possible to drain to bedrock.

BLANCHE OR MAY BELLE CLAIM GOLD HILL DISTRICT JACKSON COUNTY

The Blanche or May Belle claim, 2 miles east of Gold Hill, adjoins the Schaffer. It is owned by Guy D. Kinney. An adit follows a quartz vein in tonalite N. 65° W. 250 feet, then N. 75° W. about 100 feet. The vein is narrow; it dips 85° S. and contains quartz with some pyrite and chalcopyrite.

BLOSSOM MINE GOLD HILL DISTRICT JACKSON COUNTY

The Blossom mine, 5 miles north of Gold Hill, is in the northern part of Secs. 19 and 20, T. 35 S., R. 3 W., near the head of the left fork of Sardine creek, at an elevation of about 2400 feet above sea level. An adit on the No

Name claim extends northwestward about 200 feet in an andesitic country rock. The vein strikes N. 37° W. and dips 55° N. E.; it contains some sulphide and very little quartz, being mostly crushed country rock. Near the face of the adit there are two parallel veins. An upper adit (about 85 feet long) opens the same ore body, 75 feet higher up; it is connected with the lower adit by means of a raise on the vein. On the Blossom claim the lower adit extends about 135 feet N. 40° W. as a crosscut, thence drifts on the vein about 110 feet. The deposit strikes N. 75° W. and dips about 80° S.; it consists of a vein about 15 to 20 feet thick, in which one-quarter to one-tenth of the filling is quartz and ore. The country rock is an andesitic "greenstone." The vein minerals include pyrite, chalcopyrite, gold, galena, pyrrhotite (and sphalerite?), with quartz, calcite and sericite. An upper adit about 85 feet long discloses the same deposit with the same position and size. On this level the ore is thoroughly oxidized.

BLUE BIRD MINING COMPANY (gold and silver) BLUE RIVER DIST. LINN COUNTY

Local name, Blue Bird mine.

Office: 67 N. Third St., Portland, Oregon. S. M. Carter, Blue River, Oregon, Pres.; F. W. Brooke, Portland, Sec.; C. Marco, Portland, Treas. Capital stock, \$100,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

The property consists of 7 unpatented claims. It is located in about Sec. 28, T. 15 S., R. 4 E., 6 miles from Blue River postoffice, which is 45 miles east of Eugene on McKenzie river. There is a mountain road from this mine to the Lucky Boy mine, and then a fairly good road to the Blue River postoffice. Road from Blue River to Eugene is in good shape. Country is very rugged and plenty of timber is available.

Country rock consists of an andesitic flow-breccia. The deposit is in a brecciated zone, having a N. W.-S. E. strike, dipping nearly vertical, and the width of the brecciated zone is about 24 feet. In some places there are lenses of quartz as much as 6 feet in width. Development work consists of 2 tunnels along the fractured zone. No. 1 is 220 feet long, and No. 2 is 500 feet long. There are several short crosscuts in the brecciated zone in the lower tunnel. Development work is in partly oxidized ore, which contains some iron pyrite. No definite information is available as to values of ore exposed. A careful and systematic sampling of the vein matter exposed would be useful in directing further development work. There is a steam sawmill on the property; also a Denver grinding mill with amalgamating plates.

BLUE BIRD MINE (gold)

GRANITE DISTRICT

GRANT COUNTY

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.

BLUE LEDGE MINE (copper) UPPER APPLIGATE DIST. SISKIYOU COUNTY, CAL.

The Blue Ledge mine is about 3 miles south of Hutton (formerly called Joe Bar), in the S. E. $\frac{1}{4}$ Sec. 34, T. 48 N., R. 11 W., at an elevation of about

4000 feet, about 3 miles over the line in California, but the topography is such that all transportation connections are through Jacksonville and Medford, Oregon. It is owned by the estate of Robert S. Towne, 82 Beaver St., New York City.

The copper deposit is opened by a series of adits on the face of a cliff at different elevations; with the winzes and raises this gives a vertical exposure of the ore for about 800 feet, and a horizontal exposure for about 2000 feet. The ore consists of nearly solid pyrite and chalcopyrite, with a little pyrrhotite and rare sphalerite or galena. Microscopically the ore contains also primary tourmaline and a little biotite. The first fissures were cemented by coarse vein quartz; after shearing the second fissures were filled with calcite, chlorite and sulphides. According to numerous assays, the ore contains 3 to 4 per cent copper with about \$1.50 to \$2.00 in gold and silver. The veins average about 2 feet in thickness; so far as observed the veins are somewhat narrower and lower in grade in the lower levels. The veins strike nearly due north and dip about 65° W.; they are generally parallel with the banding of the sericite schist country rock, but locally cut across it. There are at least three veins which are roughly lenticular in form; one lens succeeds another along the strike, usually with a small offset. The hanging wall is a soft white sericite schist near the vein, but elsewhere it is a mineralized quartzite charged with some muscovite. The footwall is a bluish black hornblende schist. The position of the bedding and rock cleavage seem to indicate that the mine is on the east side of an anticline (overturned to the east), which pitches to the south. Faults are common in the workings, but usually the offset is only 1 to 5 feet, so that there is no difficulty in following the vein. The "pyrite" vein is one of the latest, as it cuts off some faults which offset the "main" vein. Pyrite in big cubes occurs, replacing the wall rocks, especially in the hanging wall.

The Blue Ledge has several thousand tons of ore blocked out. It is equipped with two air compressors and is reached by a good wagon road of very uniform grade from Hutton.

A 1500-foot aerial tram is being installed at this property. In December, 1916, the hauling of ore to the railroad, a distance of 30 miles, was begun.

BLUE RIBBON MINE (gold-silver) GRANITE DISTRICT GRANT COUNTY

About a mile east of the Buffalo-Monitor and on the Crane creek side of the ridge, is the Blue Ribbon prospect, in Sec. 16, T. 8 S., R. 35 E. It is developed by 2 crosscuts and drifts on the vein. This property is also in argillite and greenstone. In the upper crosscut drifting on the vein has opened up two bodies of ore from 2 to 10 feet wide, and in values usually between \$10 and \$20, with occasional high values. The full stope length has not been developed on this level. Several hundred feet of work has been done in a branching crosscut in a lower tunnel in the search for the vein below, but so far these attempts have been unsuccessful. A few tons of ore were sorted and shipped in 1916.

BIG BUCK or HICKS CLAIM GOLD HILL DISTRICT JACKSON COUNTY

The Big Buck or Hicks claim is 7 miles southwest of Gold Hill, near the center of Sec. 1, T. 37 S., R. 4 W., on the left fork of Foots creek. The workings are on a vertical fissure zone in massive bluish quartzite containing some vein quartz and sulphide of iron.

BIG FOUR PLACER GRANTS PASS DISTRICT JOSEPHINE COUNTY

Pickett creek flows from the west into Rogue river in T. 35 S., R. 7 W., about 10 miles west-northwest of Grants Pass. The Big Four placer mine is about half a mile from the mouth of this creek on a gravel bench overlooking Pickett creek and about 300 feet above Rogue river. According to Diller,

the mine is owned by M. J. Merrill, of Portland, Oregon, and embraces about 200 acres, chiefly on a bedrock of slate:

The gravel ranges from 30 to 70 feet in thickness, and is in part clearly stratified. The 14 feet of red earthy sand and clay overburden is said to contain fine gold that can be saved, but the larger pieces are in the bottom gravel. The lower twelve feet of gravel contains well-rounded cobblestones, the largest being 6 inches in diameter. At the bottom a few boulders, generally slate, rest on bedrock, and from 2 to 4 feet of the bottom gravel is partly cemented. The rim rock rises abruptly and slates are much crushed and faulted, forming a terrace on the northwest toward Pickett creek. The old channel is 250 feet in width and 30 feet in depth below the slate-rim terrace, from which the gravel capping has been in part mined away. The water is supplied from Pickett creek at a head of 200 feet, two giants being run for a large portion of the year. The mine has been operated, during the season when water is obtainable, for many years.

BIG HILL COAL MINING COMPANY**COOS COUNTY**

Office: 1595 E. 13th St., Portland, Oregon. F. O. Weeks, Pres.; J. W. Caldwell, Sec.-Treas., both of Portland. Capital stock, \$200,000; par value \$1.00; \$123,578 subscribed, issued and paid up. (1916 report).

This company controls 480 acres under mining lease.

BILLY BLUE MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Billie Blue mine, owned by Messrs. Joe Shaska and Wm. Swinden, is located 8 miles southeast of Grants Pass, about 2½ miles up Savage creek from the Pacific Highway. The property is developed by a 65-foot shaft and a few short tunnels and open cuts, exposing in numerous places small quartz lenses in a schist or soapstone. Free gold is found in several places on the property in these development pits and shafts, often plastered upon faces of the country rock. Good prospects were obtained by panning. A 200-foot tunnel is now being driven, which is intended to cut the vein at a depth of 125 feet.

BILLY CREEK MINING COMPANY

Office: Oakridge, Oregon. W. G. Hyland, Oakridge, Oregon, Pres.; Charles McFarland, Sec.-Treas., Eugene, Oregon. Capital stock, \$5000; par value \$100; all subscribed, issued and paid up. (1916 report).

BIMETALLIC CLAIMS (silver-gold) GREENHORN DISTRICT GRANT COUNTY

This property, now owned by Anthony Mohr, formerly called the Intrinsic, is located in Secs. 6 and 7, T. 10 S., R. 35 E., near the headwaters of Salmon creek, about 2½ 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. The elevation of the principal workings is about 7000 feet. It is on the southern slopes of a branch ridge of the main Greenhorn range.

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-porphry nor an aplite, but a sort of intermediate which might be called a granodiorite-porphry aplite, strikes north and south on the east side of the property. They were probably welled 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 half way 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 stoping 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.

This deposit is also the product of ascending magmatic waters, but the extremely soft nature of the entire lode would lead one inevitably to question the primary nature of the sulphides present, although tetrahedrite is normally a primary mineral.

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.

BIRCH CREEK MINING PROPERTY (gold) SPANISH GULCH DIST. WHEELER CO.

Richard Coe and J. H. Haggard, Antone, Oregon, owners. Two claims located in Sec. 21, T. 13 S., R. 25 E., in hilly, timbered country, near the head of Birch creek, about 13 miles from Dayville.

The country rock is silicified greenstone and an acid rock, probably alaskite. The presence of the alaskite indicates proximity to an intrusive mass of granitic rock.

There are many irregular small veins and one strong one, which has a width of 12 feet, strikes N. 60° E. and dips 45° N. This vein has over a foot of gouge on the hanging wall, and has been traced on the surface for about 1000 feet along the strike. Vein minerals are galena and sphalerite. Development work consists of several pits, a shaft about 25 feet deep and a crosscut tunnel several hundred feet long, which is being driven but has not yet reached the vein. There are good average values in gold, judging from about 100 assays

reported to be from channel samples taken in various openings upon the property.

BONANZA KING (copper) COLLIER CREEK DISTRICT CURRY COUNTY

This group consists of three claims, which are owned by E. G. Hurt, of Agness. They are located about 3 miles east of Saddle mountain, near Collier creek, the eastern boundary of the county. Mr. Hurt purchased one, the Bonanza King, of W. W. Whitton, in 1898, and another, the Bonanza King extension, from R. J. Canfield, in 1912. He located the third, the Spotted Faun, in 1912. Two tunnels, one 60 and the other 48 feet long, were driven on the property, which was also opened up by means of 8 open cuts and shafts. Although work was done as late as 1914, all of the openings have so badly caved as to make it impossible to secure accurate data concerning the deposits in 1915. From what observations it was possible to make, they appeared to be largely of the boulder type, although one or more mineralized shear-zones may also be present. In several cases a little moderately deep development has gone under the ore into seemingly barren serpentine, bearing out the conclusion that most of the deposits are of the boulder type.

The principal ore mineral is undoubtedly chalcocite or copper glance (sulphide of copper), although considerable cuprite (red oxide of copper) and native copper are also present. Magnetite (magnetic oxide of iron) seems to have been invariably associated with the copper ores, and it is claimed that this mineral itself carries copper in every case. This is borne out by the fact that a specimen of seemingly pure magnetite from the Copper King tunnel on the Collier creek group proved to contain 50.05 per cent iron, 2.43 per cent copper, and no sulphur, phosphorous, titanium or arsenic.

Where the copper ores outcrop on the surface, they have been oxidized to malachite (green carbonate of copper) and azurite (blue carbonate of copper). Occasionally a little erythrite (pink arsenate of cobalt) is also present. These substances are said to give place to chalcocite, cuprite and native copper a few feet from the surface in every case. Some of the ore still on the dumps is apparently very rich, and a general sample of such material from a number of points on the Bonanza King group yielded 20 per cent copper, .06 oz. gold, and .12 oz. silver per ton.

A chunk of native copper supposed to have come from this group, which, although only a fragment of the original piece, weighs 3½ pounds. It is coated with malachite and other oxidation products.

BONANZA MINE (gold) GREENHORN DISTRICT BAKER COUNTY

In Sec. 8, T. 10 S., R. 35½ E., and about 4 miles east of Greenhorn and 8 miles by wagon road from Whitney, is the old Bonanza mine, discovered in 1877, and actively operated from 1892 until December, 1904, since which time leasers at different times have mined ore from some of the old workings. The total production was approximately \$1,750,000. From the various levels the property is developed to a depth of 1250 feet below the outcrop.

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

BONE OF CONTENTION MINE (gold) LOWER APPLGATE DIST. JOSEPHINE CO.

The Bone of Contention mine, 15 miles southeast of Grants Pass, is on the line between Secs. 24 and 25, T. 38 S., R. 5 W., on the east side of Williams creek, at an elevation of about 1700 feet, as measured by barometer. It is near the border of an area of tonalite, which extends northward about 2 miles. The tonalite is here in contact with argillite; it is also cut by dikes of aplite.

The mine is equipped with two ore bins, water power obtained from a ditch, and Pelton wheel, a 15-stamp mill with 2 amalgamating plates each 42 by 120 inches, and a concentrating table. The main adit enters S. 77° E., but contains too much water to permit inspection. It is evident from the dump that it leads to several thousand feet of workings. The mine has been idle for several years.

BOULDER CREEK MINING COMPANY CORNUCOPIA DISTRICT BAKER COUNTY

See "The Underwood Placers."

BOURNE GOLD MINING COMPANY (gold) CRACKER CREEK DIST. BAKER CO.

Local name: E and E mine.

Office: 705 Chamber of Commerce Bldg., Portland, Oregon. Jonathan Bourne, Jr., Pres.; I. M. Arneson, Sec. Capital stock, \$1,000,000; par value twenty cents; all subscribed, issued and paid up. (1916 report).

The lands consist of 2 claims, the Eureka and the Excelsior, upon the North Pole-Columbia lode, and other quartz claims; 7 placer claims, with 2 millsites in the district, all patented. The shaft and surface plant is located about one-quarter mile west of Bourne and about 6 miles north of Sumpter, a station on the Sumpter Valley R. R. (narrow gauge), at an elevation of about 5500 feet.

The general description of the North Pole-Columbia lode, of which the E and E mine is a part, will be found under the "Columbia Gold Mining Company," to which the reader is referred. There has been no change in status of the company since 1914, although representatives of some of the leading development companies have visited the property, having in mind some sort of a consolidation with other companies on the lode, but conditions imposed by the owners have not as yet proved sufficiently attractive.

BOULDER CREEK GOLD MINING COMPANY (gold) OPHIR DIST. CURRY COUNTY

Local name, Star mine, Old Diggings.

Office: 80 60th St., Portland, Oregon. R. D. Hewitt, Pres., Agness, Oregon; John Gardner, Sec.-Treas., Agness, Oregon. Capital stock, \$25,000; par value \$100; \$24,999 subscribed; \$21,076 issued and paid up. (1916 report).

At the junction of Boulder creek and the south fork of Lobster creek, in Sec. 25, T. 34 S., R. 13 W., is an extensive bar known as Old Diggings, consisting of 80 acres and 160 acres, under the name of Star mining claims. This company intended to work this property extensively with giants during the winter (1915-16), and, with this end in view, had ordered 1000 feet of piping to communicate with a long ditch constructed by A. W. Wilheit. It is reported they have the following improvements: "4800 feet completed ditch, 1 dam 74x12x8 feet, 1 dam 60x3 feet, sawmill plant with water power, 800-foot pipe giant, blacksmith shop, tools, 3 cabins." \$4800 worth of improvements the past year.

BOWDEN CLAIM (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Bowden claim, 4 miles east of Gold Hill, is on the southeast slope of Blackwell hill, near the top of the grade on the road in Sec. 30, T. 36 S., R. 2 W. It has a quartz vein in tonalite, shown by an adit now open about 150 feet, and said to have extended 500 feet, and also by a shaft, where the vein strikes N. 75° E. and dips about 85° N. The shaft is said to be 185 feet deep and to have yielded free gold at 100 feet. The vein was apparently 2 to 3 feet thick where stoped.

Press reports of November, 1916, state that H. H. Leonard, of Gold Hill, is now the sole lease holder and expected to proceed with the unwatering of the shaft and sampling of the workings.

BOWDEN PROSPECT (gold) ILLINOIS RIVER DISTRICT JOSEPHINE COUNTY

Diller says:

Mr. Samuel Bowden, of Grants Pass, has opened a number of claims on the North Fork of Canyon Creek and Lightning Gulch, in greenstone on shear zones, veins of quartz or dikes of dacite porphyry cutting the greenstone, and reddish cherts that are radiolarian and certainly of sedimentary origin. In all these places the greenstone is more or less impregnated with pyrite and in some of them with chalcopyrite. The shear zones and quartz veins run N. 20° E. and dip 40° SE. The greenstone in places is practically a chlorite schist and is then most probably full of pyrite. The reddish chert is closely related to that of the Pocket Knoll region and lies only a short distance beyond the western limit of the great serpentine belt that crosses the North Fork of Canyon creek at the falls, half a mile above its mouth. In the same region the Telluride Gold Mining Company of Seattle has 5 claims. It is reported by Mr. Bowden that several tons of ore were shipped to Tacoma as a test and yielded good returns.

BRADBURY MINE (gold) GALICE DISTRICT JOSEPHINE COUNTY

The Bradbury mine is on the east side of Rogue river about 1¼ miles below the Alameda. It is opened by 3 adits at elevations about 150, 420 and 525 feet above the river. The upper adit enters as a crosscut in schistose country rock extending N. 90° E. 160 feet, where it turns southward to drift about 70 feet on a lead varying from 1 to 50 inches wide, which strikes N. 17° E., and contains 0 to 40 inches of quartz. The middle adit is caved shut at the portal. From the dump it is clear that this adit is several hundred feet long in schistose greenstone, containing a vein of white quartz, carrying a little pyrite and rare free gold. The lower adit extends N. 8° E. about 120 feet in greenstone, containing thin seams and a few bunches of quartzose ore.

BRADEN MINE (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Braden mine is in the S. E. ¼ Sec. 27, T. 36 S., R. 3 W., at an elevation of 1350 feet, about 2 miles south of Gold Hill. It is at present (1913) one of the important mines of Jackson county. It has a 10-stamp mill equipped with a crusher, two 10-foot plates, 4 Johnson vanners, and electric motors, one of 85-horsepower being used to operate an air compressor. According to E. W. Liljegan, of Medford, the mine was located about 30 years ago by B. A. Knott, of Gold Hill, who began development, treating the ores in an arrastre. After several transfers the mine passed to Dr. James Braden, after whom it has since been called. It was sold to C. R. Ray, of Medford, in 1900; seven years later it was leased to the Opp Mining Company; it is now operated by Dr. Ray. In 1907 the mine produced more than \$30,000.

There are several quartz veins opened by 6 adits and an incline shaft. The important veins strike about N. 30° E. and dip about 25° S. E. There are four main levels opened by adits at different elevations on the sidehill and connected with one another by raises and winzes. The workings have a total length of more than 3000 feet, but the greatest depth reached is less than 250 feet. The lowest adit (No. 6) has a length of more than 1200 feet, and has yielded considerable high grade ore.

The country rocks of the Braden mine are Paleozoic sediments and interbedded andesites. A rock from the dump of adit No. 2 is plainly banded, some bands being chiefly green hornblende with some quartz, chlorite, zoisite and pyrite, and other bands being chiefly calcite or, rarely, quartz; it is a calcareous hornblende schist. Another sample from the same adit is an amphibolite, containing abundant green hornblende, some pale yellow epidote, some zoisite, some interstitial plagioclase, some garnet, and a little magnetite. But the hanging wall of the vein under the incline shaft is apparently a spessartite, containing abundant hornblende grading from brown to green, abundant plagioclase, some zoisite, calcite, sericite, magnetite and siderite.

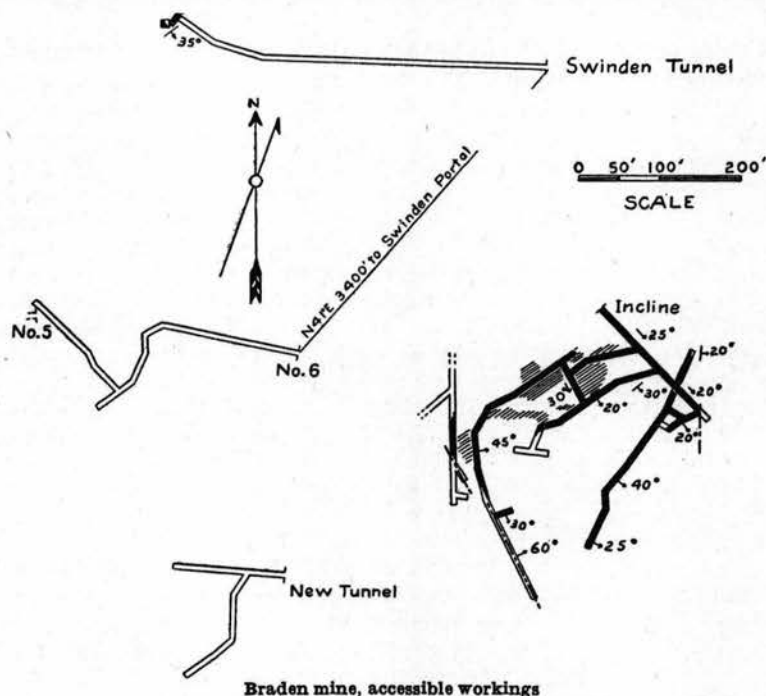
The ore is highly quartzose, containing a little calcite and some pyrite, as well as a little arsenopyrite, chalcopyrite, and galena. About 65 per cent of

the gold and silver is recovered on the plates and about 25 per cent is saved in concentrates, which are sent to a smelter at Selby or Tacoma. Concentration is about in the ratio 12 to 1; the assay value of the ore is \$8 to \$10 a ton and of the concentrates about \$25 a ton.

According to G. F. Kay:

Most of the production of the mine has come from two shoots nearly 600 feet apart, on the lowest drift of the mine. One of the shoots extended along the vein in this drift for about 55 feet, but in a winze its width increased to about 80 feet, below which it narrowed abruptly. The direction of the shoot was the same as that of the dip of the vein. The other shoot had a length along the strike of the vein of 75 feet; in a winze from it the length increased to 125 feet; at the bottom of the winze, which was run 200 feet below the drift, the ore was low in grade. The direction of this shoot was about S. 50° E. Usually the best ore was found along the footwall of this shoot, although in places the gold and silver were uniformly distributed across the vein, which here had an average width of about 18 inches. The zone of oxidation does not extend farther than about 100 feet below the surface, and in parts of the vein sulphide ores are found at depths considerably less. Along the fault planes the ores show enrichment.

Since the date of Professor Kay's examination of the Braden mine another shoot of ore has been opened on another vein by means of an incline shaft. The vein strikes about N. 55° E. and has an average dip of about 25° S. E., with a thickness of 2 to 5 feet of quartz. In the lowest drift at 190 feet depth on the incline a second vein seems to swing into the main later vein from a direction about N. 10° E. and a dip of about 35° E.; it has been followed back under the incline shaft and shows about 2 feet of quartz. The structure is shown in the illustration. To the southwest the vein seems to be cut off by a



fault which strikes N. 27° W. and dips about 60° N. E. The drawing shows only a small part of the older workings, which were caved so as to be mostly inaccessible when the mine was visited.

The mill was dismantled in 1916 and a good part of the equipment sold to A. W. Bartlett, of Ashland, to be used in equipping the mill at the Ashland mine.

BRANTER MINE (placer) UPPER APPLGATE DISTRICT JACKSON COUNTY

The Branter mine is on Applegate river near the mouth of Keeler creek, and 3 miles east of Applegate, in Sec. 25, T. 38 S., R. 4 W. It is owned by D. H. Mansfield. In the present workings the sands and gravels have a thickness of 30 to 35 feet and show distinct stratification. Many large angular and subangular boulders (chiefly of greenstone) are found at and near the base of the deposit. The bedrock is decomposed greenstone. The mine is equipped for hydraulicking, the water used having a pressure of about 100 feet.

BRAZOS MINES COMPANY (gold) VIRTUE DISTRICT BAKER COUNTY

Local name, Brazos mine.

Office: Baker, Oregon. Al Geiser, Pres.; Mose Fuchs, Sec.; John Thomson, Treas. Capital stock, \$25,000; par value \$1.00; \$15,000 subscribed, issued and paid up. (1916 report).

Two miles north from Pleasant Valley, a station on O.-W. R. & N. Company line; situated in gently rolling sagebrush-covered hills; Sec. 11, T. 10 S., R. 41 E. Elevation 4100 feet; in Burnt river drainage. Wagon road to Pleasant Valley. Lands, three claims—Brazos, Pleasant Valley and Queen Bee.

The development of the Brazos is of recent date, and a 10-stamp mill was erected on it late in 1900. The developments consist of a tunnel with 1,000 feet of drifts, no ore having been stoped at the time of the visit, in August, 1900.

A black argillite, most of it soft and crushed, and without clearly defined bedding planes, forms the country rock. The vein strikes northwesterly and dips 20° to 30° SW. The croppings, which are not conspicuous, rise to 125 feet above tunnel level. The hanging wall is clearly defined by a clay seam, while the foot wall is also well marked. The width averages 3 or 4 feet, the vein matter consisting of soft, black argillite full of little nodules of quartz, rarely forming continuous veins. The appearance suggests that movements on the vein have separated the quartz into isolated lenses. All of these quartz seams and nodules carry gold, some of it being coarse. The pay shoot is claimed to extend for 400 feet along the vein. The ore is probably low grade, but the cost of extraction and treatment, on the other hand, should be very low.

In its northwesterly continuation the Brazos vein changes character, and the vein is exposed on the Pleasant Valley by a 175-foot incline as a normal quartz vein filled with 3 to 4 feet of massive quartz said to assay from \$2 to \$7 per ton. (Lindgren, p. 726-1901)

The development since 1900 consists of a 600-foot shaft and considerable drifting. Very little is reported to have been done in the last 5 years. None in 1915.

BRIERHILL COAL AND COKE COMPANY WASHINGTON

Office: Portland, Oregon. G. W. Weatherby, 432 E. Salmon St., Portland, Oregon, Pres.; F. A. Bruckman, Sec., and G. W. Weatherby, Treas. Capital stock, \$75,000; par value \$1.00; \$44,400 subscribed, issued and paid up. (1914 report.)

This company's properties are located in Pierce county, Washington.

BRIGHT CARBONATE MINING COMPANY (silver-gold) GREENHORN DISTRICT GRANT COUNTY

Local name, Bright Carbonate mine.

Office: 118 East Webb St., Pendleton, Oregon. George Darveau, Pres.; John Seibert, Sec.-Treas., both of Pendleton. Capital stock, \$60,000; par value \$1.00; all subscribed, issued and paid up. (1916 report.)

This company owns 3 claims 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 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.

BROOKLYN GROUP (copper, gold, silver) HOMESTEAD DIST WALLOWA COUNTY

These claims, owned by A. P. Carnahan, are situated about 12 miles north of Homestead and about $\frac{1}{2}$ mile from the river, both vertically and horizontally. The location of the camp is a picturesque one, situated as it is in an open space on the edge of a heavy forest, with precipitous rocky walls both above and below.

These rocks are quite similar to those at MacDougall's. They consist of amygdaloids, breccias and dense flows cut by granodiorite-porphyry dikes. The amygdules are filled chiefly with calcite, although some contain calcite and epidote, and some quartz and epidote. Volcanic breccia resembling Lake Superior rocks have cementing material of calcite with small amounts of chlorite associated with it. At another point dense greenstones similar to those at the Iron Dyke contain minute grains of iron pyrite.

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

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

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

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

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

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

BROOKLYN MINE (gold) WALDO DISTRICT JOSEPHINE COUNTY

The Brooklyn mine, formerly known as the Gold Pick, about 9 miles southeast of Holland, is about three-quarters of a mile, as the crow flies, from

the mouth of Bollon creek, at an elevation of about 3500 feet. The main adit is about 300 feet long, entering in a direction west of north; it opens a vein about 12 to 20 inches thick, containing 2 to 12 inches of quartz, which strikes N. 35° W. and dips 55° N. E. This adit is connected by a tramway with a mill on Bollon creek about 600 feet lower. Near the mine Paleozoic argillitic rocks are intruded by amphibolite, diorite and diorite aplite. The ore is white quartz, with very little pyrite; there is more pyrite in the adjoining greenstone. The ore is stoped out above the adit level, but the stopes have a short length horizontally. The ore was apparently of higher grade near the surface.

BUCK GULCH MINE (placer) SUMPTER DISTRICT BAKER COUNTY

This mine is owned by Fred Gowing, A. I. Snyder and associates, of Oakland, California, and located in Buck gulch, a small tributary which drains into McCully fork, a branch of Powder river, about 4 miles by road from Sumpter. The property is located in Sec. 26, T. 9 S., R. 36 E., at an elevation of about 5300 feet.

This placer deposit is an old buried stream channel extending southwest beneath the low range which separates the Powder river drainage from that of the North fork of Burnt river. It is supposed to extend underneath this ridge for about three miles and its maximum depth below the apex of the ridge is about 600 feet. One end of this three-mile remnant of the ancient river system is exposed in Buck gulch and the owners of this mine have driven a 900-foot tunnel through the rim to bedrock to enable them to prospect the gravels thoroughly. Enough of this work has been done in a series of drifts and raises to prove the existence of sufficient yardage of high grade gravel to warrant the bringing of water to the property and the equipping of a good sized plant to wash the gravels. Electric power for the washing plant is being brought from the Sumpter Water and Light Company's plant at Sumpter and a dam is being built across the gulch above the mine to create a reservoir, which will be filled by a 7-mile ditch with water taken from McCully fork.

BUCK GULCH PLACER SUSANVILLE DISTRICT GRANT COUNTY

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.

BUCKEYE MINE (copper) LOWER APPLIGATE DISTRICT JOSEPHINE COUNTY

The Buckeye mine is owned by an Ohio company. It is about 5 miles northwest of Waters Creek station on Oregon & California Coast Railway, on the east fork of Slate creek, at an elevation of about 2650 feet, as measured by barometer. An adit extends N. 20° W. 65 paces without disclosing any ore or any distinct vein. At 50 paces crosscuts have been run both ways a few feet. A cyclone drill has been used. The ore on the dump contains pyrite, pyrrhotite, chalcopyrite, bornite, malachite and chrysocolla. The country rocks are serpentine, andesite, diorite, and shale grading toward argillite. The shale strikes east of north and dips about 45° S. E. Two adits higher up are said to be 60 and 70 feet long, respectively. The ore is in the andesite near the contact.

BUFFALO GROUP GALICE DISTRICT JOSEPHINE COUNTY

The Buffalo group is at the head of Quartz creek on the slope of Peavine mountain, at an elevation of about 4000 feet. The Chieftain claim, owned by Mr. Wayment, is about 2 miles west of the Oriole mine. According to Diller, a belt of quartzite about 300 feet wide passes through this group; it has serpentine to the west and greenstone to the east of it. On the Dixie claim

irregular veins and bunches of quartz carrying pyrite and chalcopyrite strike N. 23° E. and dip 68° N. W.

BUFFALO-MONITOR MINE (silver and gold) GRANITE DISTRICT GRANT COUNTY

The Buffalo-Monitor, situated on the southern slope of the divide between Granite creek and the north fork of the John Day river and about 5 miles from Granite, in Sec. 16, T. 8 S., R. 35½ E., has 2 types of veins, the one narrow and frequently frozen to the walls and of high grade, and the other a broad shear zone about 50 feet wide, of crushed argillite of low value. The narrow high grade veins are between walls of a dense highly siliceous argillite and close to the granodiorite intrusion which was observed in the development of the No. 3 vein, the farthest one in. These small veins are made up of gouge and fragments of argillite cemented together with quartz and hardened by silicification.

The ore minerals are pyrite, galena, tetrahedrite, chalcopyrite, and some stibnite, although occasional bunches high in galena contain gold and silver up to several hundred dollars a ton. Most of the ore shipped contained about \$100 in silver and gold in the ratio of 16 to 1 by weight. The widest of all the various lenses was 30 inches; they were rarely more than half that and frequently only a few inches wide. Their stope and pitch length were usually only a few feet.

The Monitor vein, approximately 50 feet wide, made up of crushed argillite with occasional seams of quartz, has been developed by one crosscut and some drifting and other incomplete crosscuts. The channel samples in the one crosscut taken in 5-foot section averages for the full width between \$1 and \$2.

The property has not produced for 5 years. The total production is said to amount to about \$75,000, entirely from the 3 small veins.

This property is under lease to William Narkaus and associates, who in 1916 installed a gasoline-driven compressor and air drills for use in extracting high grade ore from the Buffalo veins.

BULA MINE

ASHLAND DISTRICT

JACKSON COUNTY

The Bula mine, sometimes called the Lamb mine, because it is now owned by Coachman and Lamb, of Ashland, is situated 4 miles south of Ashland and about half a mile east of Ashland creek, on a ridge, at an elevation of about 3700 feet, as measured by aneroid barometer. It consists of five claims on one or more veins, which are opened by a shaft and two adits about a quarter mile apart, as well as some surface trenches or "pot holes." The south-easterly adit, at which an ore bin has been erected, consists of a crosscut entry about 100 feet long to the vein and a drift extending S. 30° E. about 200 feet. The country rock is tonalite and the vein is an altered zone in a dike and along the contact between the dike and the country rock. The vein contains some quartz and so much "clay" (probably sericite) that it gives trouble by caking about the die in the milling, which has been done in a Lane Chilian mill. The clay is also the probable cause of the poor extraction reported from this ore. The northerly adit consists of a crosscut entry extending southeast 125 feet to a vertical dike, which was followed S. 35° E. 325 feet. As this disclosed no ore and only a little vein material, the tunnel was turned due east to cut another vertical dike disclosed by surface prospecting about 200 feet eastward. This parallel dike has not yet been reached by the tunnel, which now extends about 120 feet from the first dike.

About a mile south of Lamb's house on the east fork of Ashland creek a prospect adit extends S. 60° E. about 45 feet in a slightly porphyritic tonalite, following fissures which contain a little vein quartz, some altered feldspathic material and some fault gouge. About a mile above the forks of Ashland creek on the east branch the coarse tonalite is displaced by an intrusive finer

grained aplite with pegmatitic variations. On the south fork of Ashland creek the tonalite is similarly intruded by aplite and pegmatite. (1914 report.)

BULLION MOUNTAIN MINING COMPANY**CALIFORNIA**

Office: Silverton, Oregon. E. S. Porter, Pres.; Marian Palmer, Sec.-Treas., both of Silverton. Capital stock, \$1,000,000; par value \$100; \$7885 subscribed, issued and paid up. (1916 report).

This company's properties are located in Siskiyou county, California.

BUNKER HILL AND SULLIVAN MINING AND CONCENTRATING COMPANY IDAHO

Office: 501 Chamber of Commerce Bldg., Portland, Oregon. F. W. Bradley, San Francisco, Cal., Pres.; George F. Holman, Portland, Sec.; William H. Crocker, San Francisco, Treas. Capital stock, \$3,270,000; par value \$10; all subscribed, issued and paid up. (1916 report).

This company owns the well known Bunker Hill and Sullivan mine, located at Wardner and Kellogg, Idaho.

BUNKER HILL GROUP (copper-cobalt) COLLIER CREEK DIST. CURRY COUNTY

This group is composed of 6 claims, situated on and to the northwestward of Bunker Hill, and about 1 mile west of Collier butte, and is owned by Mr. Frank Berry. Only a few small pits have been dug on this property, but these are sufficient to show that the deposits are practically identical in character with those in the Collier creek copper region; that is, they are boulder and shear-zone deposits in serpentine. The magnetite associated with the copper ores has, however, crystallized in small but well formed cubes instead of octahedrons, which type of crystallization of magnetite is so unusual as to seem deserving of mention. Another peculiarity of the Bunker Hill outcrops is the relatively large proportion of erythrite (arsenate of cobalt). Whether sulphides of cobalt are present in any quantity in the ores could not be ascertained.

On the northeastern slope of Bunker Hill occurs a dike of dacite-porphyry, through which more or less pyrrhotite (monosulphide of iron) is disseminated. This mineral occurs in both irregular grains and as small tabular hexagonal crystals in miarolitic cavities. Mr. Frank Berry stated that this material has yielded assays for gold, one return being as high as \$80 to the ton; but a general sample taken from a number of fragments lying on the surface yielded not a trace of gold.

BURDIC MINE (gold)**ASHLAND DISTRICT****JACKSON COUNTY**

The Burdic mine is near the center of Sec. 13, T. 39 S., R. 1 W., on a hill east of Wagner creek, and about 2½ miles west of Ashland by wagon road. It is owned by Burdic and Grant, of Ashland. The lower adit at an elevation of about 3140 feet follows small fissures and quartz stringers for about 60 feet southeasterly into the hill. About 100 yards to the southeast the upper adit at an elevation of about 3270 feet follows a southeasterly course. The adit enters on a slip showing some fault gouge, but very little vein material; the nearly vertical fissure turns to the south before playing out. The adit continues and turns at a point about 100 feet from the portal to follow for about 150 feet a vein in a diorite dike in tonalite. The vein is narrow, but the dike, which is silicified, chloritized and mineralized, is about 4 to 10 feet thick. The mineralization extends especially into the hanging wall and the foot wall is chloritized. The dike seems to vary from a dark basic diorite to a diorite-aplite or malchite. The water circulation followed a fault gouge about an inch thick. The strike of the vein is N. 80° W. and the dip is about 85° S. Assays of the ore are reported to have been higher at the surface than in the adit below.

BURNT RIVER DREDGING COMPANY WEATHERBY DISTRICT BAKER COUNTY

Local name: probably Pomeroy Dredging Ground.

Office: 506 Oregonian Bldg., Portland, Oregon. O. E. Tisch, Tacoma, Pres.; D. D. Wallace, Portland, Sec.-Treas. Capital stock, \$250,000; par value \$1.00; \$139,125 subscribed; \$39,125 issued and paid up. (1916 report).

The following news item was taken from the Portland Oregonian March 4, 1916:

Baker, Oregon, March 3 (Special). J. H. Callahan of Portland, representing the Burnt River Dredging Company, composed of Portland and Tacoma people, announced while in the city today that the company will install a \$15,000 gold dredge on Burnt river the first week in April.

The company has a 680-acre tract eight miles south of Durkee and has control of a stretch of the river for three miles and a half on each side.

Mr. Callahan says the company plans to install a dredge of large size before the end of the year. Prospecting has shown values of 30 cents to \$4 a yard.

The location of this ground, as described above, indicates that it is the old Pomeroy dredging ground situated immediately below Weatherby on the O.-W. R. & N., about 14 miles northwest from Huntington.

BUTLER ANTIMONY CLAIMS (antimony-silver) NEW ELDORADO DIST. GRANT CO.

This prospect is in about Sec. 2, T. 10 S., R. 33 E., approximately 4 miles east of Susanville, on the steep west slope of the north branch of Big Boulder creek. These claims were located in 1914.

The country rock is granodiorite. A nearly vertical vein strikes N. 70° W., and is about 12 feet wide where it is opened up in 2 or 3 surface cuts. The vein consists chiefly of quartz, with small included crystals of stibnite, the sulphide of antimony. In places stibnite is abundant in stringers about an inch wide. The vein is of the replacement type, and is reported to have, in the few assays made, about 30 ounces of silver.

BYERS AND HOLLENBECK CLAIMS (placer) SIXES RIVER DIST. CURRY COUNTY

A. G. Byers and G. H. Hollenbeck own two placer claims on the south side of the South fork of Sixes river, which they acquired by location in August, 1915. At the time this examination was made they had just begun work, and had panned about 50 pans of gravel, which averaged one good color per pan.

The gravel bank is an old bench 15 feet above the present water level, and averages about 10 feet in thickness. The best values are said to exist on the bedrock. When interviewed, the owners were planning to sluice the gravel.

**CALAPOOIA AND BLUE RIVER MILL AND MINING COMPANY (gold, silver)
BLUE RIVER DISTRICT LANE COUNTY**

Office: Brownsville, Oregon. W. B. Blanchard, Pres.; C. E. Stanard, Sec.-Treas., both of Brownsville. Capital stock, \$300,000; par value \$1.00; \$200,000 subscribed, issued and paid up. (1916 report).

The property is in T. 15 S., R. 4 E., and consists of 5 patented claims and 1 claim held by location.

Most of the work is done upon one of the patented claims called the "Poorman," where there is a 600-foot tunnel, which samples from \$3.00 to \$24.00 per ton. The other claims have been prospected, and all show gold, silver and "base ore."

There is a 2-stamp Tremain mill on the property. There is little activity at present. Information given by W. B. Blanchard.

CALIFORNIA CONSOLIDATED MINES COMPANY

Office: 63 Sixth St., Portland, Oregon. H. W. Manning, Pres.; M. Manning, Sec., both of 63 Sixth St., Portland. Capital stock, \$750,000; par value \$1.00; \$376,040 subscribed, issued and paid up. (1914 report).

This company may be the owner of the California mine, which see.

CALIFORNIA MINE (gold) CABLE COVE DISTRICT BAKER COUNTY

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

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

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

CALUMET MINE (gold, etc.) ILLINOIS RIVER DISTRICT JOSEPHINE COUNTY

Concerning this mine Diller says:

The Calumet mine embraces 9 claims, extending from Illinois river at the mouth of Rancherie creek southwest by the forks of the creek for a mile and a half. The country rock is serpentine and tuffaceous greenstone. The fragmental character of the greenstone demonstrates its volcanic origin and also shows that it is intruded by the serpentine. As a result the greenstone at a number of places on or near the contact is more or less richly mineralized with pyrite, pyrrhotite, and some chalcopyrite and galena.

The principal openings of this mine for pyrrhotite and auriferous chalcopyrite are near the mouth and forks of Rancherie creek. They are described in this report under the head of "Copper Mines" because of their relation to the deposit on Fall creek. It is reported, however, that most of the value is in gold.

The greater underground workings of the Calumet mine are in a hill of tuffaceous greenstone nearly surrounded by serpentine about a mile southwest of the forks, higher up the spur than the outcrops of pyrrhotite. On the summit of the hill is a prominent quartz ledge said to carry \$4 to \$8 a ton in gold. The hill has been tunneled from all sides by nearly 2,000 feet of workings designed to test its ores. Quartz veins are common and run in various directions from N. 40° W. to N. 70° E., centering in the hill. The best quartz veins visible carry chalcopyrite and galena, but the material generally carries free gold. The hill contains a great deal of low-grade ore that might be concentrated, and if the large 500 foot tunnel now far beneath the summit ledge strikes paying ore it might furnish a convenient means of removing a large body of ore.

CAMERON PLACER WALDO DISTRICT JOSEPHINE COUNTY

See "Logan, Simmons & Cameron" mine.

CAMP BIRD CLAIM WALDO DISTRICT JOSEPHINE COUNTY

The Camp Bird claim, owned by Herz and Tibbits, about 11 miles southeast of Holland, is near Bollon lake at the place formerly called Gold Center, at an elevation of about 5300 feet, as measured by barometer. The adit extends S. 70° W. 50 paces in a fine grained auganite containing phenocrysts of labradorite and colorless augite with rare pale brown hornblende in a felsitic matrix of the same minerals with chlorite and a black mineral suggesting ilmenite. At the face of the adit a quartz stringer strikes N. 65° W. and dips about 80° S. W. At the discovery shaft a quartz vein about 6 inches wide strikes west and dips about 75° S.; this shaft is about 300 feet N. 60° W. of the portal of the main adit, and about 120 feet higher.

CAMP CARSON MINE (placer) CAMP CARSON DISTRICT UNION COUNTY

This property is owned by Turner Oliver, of La Grande, Oregon, secured from the Camp Carson Mining and Power Company through liens. It is situated in the southern part of T. 6 S., R. 36 E., and is directly west of North Powder, a distance of 28 miles by wagon road, and about 45 miles by wagon road south from La Grande. The elevation of the property is about 6000 feet.

It consists of 72 claims, but the part of chief interest is that found in the 3

very large pits along the north-south strike of a series of gravel beds, which extend for about 1 mile and dip to the west at an angle of about 25 degrees. The hydraulicking of these separate pits, which have depths of from 10 feet to more than 100 feet, has exposed a series of semi-consolidated beds composed of alternating layers of gravels, granitic sand and soft shales. The inclined bedrock is granite and upon it rests coarse gravels with occasional large boulders and many smaller ones from 6 to 12 inches in diameter. These beds are so persistent in thickness over a long distance along the strike and composed of such large gravel which grade off gradually with no evidence of cross-bedding, so characteristic of river gravels, that it seems likely that these are lake bed deposits of early Tertiary age.

These gravel beds have been worked intermittently by several companies and numerous hydraulic processes with indifferent success. In the largest pit the beds exposed above the granite are from 75 to over 100 feet thick, but which bed or beds carry workable values has not been determined. This information is prerequisite to planning proper methods of mining, and since the chief values are said not to be free, but are contained in sulphides, a method of recovery should be very carefully worked out after extensive sampling had proven that there is sufficient value in the gravels to warrant such experimentation.

CAMP CARSON MINING AND POWER COMPANY CAMP CARSON DIST. UNION CO.

Office: Hoge Bldg., Seattle, Washington. B. F. Walling, Pres.; B. F. Knapp, Sec.-Treas., both of Seattle. Capital stock, \$125,000; par value \$100; \$122,800 subscribed, issued and all paid up. (1916 report).

This company was organized to operate the Camp Carson mine, but the property was afterward sold to Turner Oliver, of La Grande, Oregon, to satisfy the liens upon it. It is now owned by him. The Camp Carson mine is described under that title.

CANYON CREEK CONSOLIDATED GOLD MINES (California corporation) (gold)
ILLINOIS RIVER DISTRICT JOSEPHINE COUNTY

Diller says:

The property of the Canyon Creek Consolidated Gold Mines Company embraces 7 claims near the head of the North Fork of Canyon Creek, about 8 miles directly west of Kerby, at an elevation of about 2,900 feet. After a number of prospect openings, more or less promising, were made high up on the slope, a tunnel was run 500 or 600 feet below to find their downward extension. The tunnel is of good size and 300 feet long in greenstone. No important body of ore has yet been reached. A small stringer was cut, yielding \$65 in gold and silver to the ton. About 90 feet of rock tunneled is more or less impregnated with pyrite and is said to assay from \$2 to \$4 a ton. It is proposed to continue the search for the rich ore.

An opening on the creek nearly a mile above the mine exposes a slickensided fault plane striking N. 60° E. and dipping 60° SE.

CANYON MOUNTAIN MINING COMPANY (gold) CANYON DIST. GRANT COUNTY

Local name, Mountain View mine.

Office: Canyon City, Oregon. Jackson Chambers, Pres.; F. S. Slater, Sec.-Treas., 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 1¼ 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 degrees, 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.

CANYONVILLE MINING COMPANY

Articles of incorporation filed December, 1916, with a capital stock of \$10,000; par value \$1.00. A. E. Sessions, Pres.; George S. Reid, Treas.; Chas. B. Baily, Vice-Pres. and Sec.

CAP MILLER GROUP (copper) HOMESTEAD DISTRICT BAKER COUNTY

This prospect consists of 6 claims and joins the MacDougall group to the south, and has the same type of copper glance deposits, with wide outcrops of promising appearance.

CAPE BLANCO OCEAN BEACH MINE (placer) SIXES RIVER DIST. CURRY COUNTY

The present ocean beach in the vicinity of Cape Blanco is reported to be unusually rich, and there seems no doubt but that large quantities of gold have been extracted from the sand by means of primitive methods. A Sweet gold machine was installed on this beach during the summer of 1915, but while considerable gold and platinum was recovered, it was found impossible to work the sand profitably, as the strong winds which prevail there filled up the cuts as fast as they could be made.

CARDWELL CLAIM (placer) MULE CREEK DISTRICT CURRY COUNTY

W. W. Cardwell, of Roseburg, owns a placer claim on the west fork of the west fork of Mule creek. It can be operated only when water conditions are favorable, as the gold is being recovered from the gravel in the present creek bed. It is reported that it has been quite profitable.

CARLTON GROUP (copper) GALICE DISTRICT JOSEPHINE COUNTY

With reference to this group, Diller says:

The Carlton group, embracing 9 claims, lies on both sides of the South Fork of Galice creek 3 miles southwest of Galice, at an elevation of nearly 1,400 feet. The country rock is slate and greenstone, and their contact corresponds to the position of the Great Yank lode on which the Alameda mine is situated. Two tunnels, aggregating about 250 feet in length, run into the greenstone near the contact. The greenstone in places where sheared is richly impregnated with pyrite and some chalcopyrite. The rock is so richly pyritized that if auriferous it would afford a concentrating ore. An assay made for the Geological Survey by E. E. Burlingame and Company yielded a trace of gold. Some ore bodies are reported on the hillside a short distance south of the tunnels referred to, but the tunnels have not yet reached them.

CARPENTER HILL MINE BAKER DISTRICT BAKER COUNTY

The Carpenter Hill mine is located on Salmon creek in Sec. 8, T. 9 S., R. 39 E., above the old Nelson placers. A tunnel has been driven 1200 feet in greenstone and intercepts many quartz veins, the largest of which is seldom wider than 6 inches. There is a 5-stamp mill on this property, but operations ceased several years ago.

CARTINELL MINE (copper) GOLD HILL DISTRICT JACKSON COUNTY

The Cartinell mine is near the center of Sec. 9, T. 36 S., R. 4 W., less than 2 miles northwest of Woodville, at an elevation of 1250 feet by barometer. An adit extends due northwest about 150 feet and thence N. 55° W. about 50 feet in a fissured zone containing short offsetting lenses of quartz with bunches of chalcopyrite. The vein dips to the northeast at an angle of 50 to 60°; in the weathered zone it contains malachite and azurite. The country rock is andesite, in which the curved cleavages of phenocrysts of pale green hornblende show evidence that the rock has been under considerable differential pressures.

CASCADE COAL MINE**JACKSONVILLE DISTRICT****JACKSON COUNTY**

The largest supply of fuel provided by nature in the Jacksonville district is to be found in the deposits of coal interbedded with Tertiary sediments, probably of Eocene age. There are several seams of coal in the district and some of them have been opened by incline adits or slopes of notable length. Thus, the Cascade coal mine, about 5 miles northeast of Medford, is opened by a double track entry running in N. 87° E., said to be 900 feet long, with a slope at right angles to the adit inclined at an angle of 15 to 18°, and said to be 250 feet on the incline. The workings were nearly full of water when visited in June, 1913. The coal occurs in seams up to 6 inches thick, and is somewhat lenticular or irregular; it is reported to be better with depth. The mine is in Sec. 3, T. 37 S., R. 1 W., at an elevation of 1470 feet, as measured by aneroid barometer. Nearby a small incline has been run N. 40° E., showing a coal-bearing seam about 2 feet thick, which strikes N. 50° W. and dips about 10° N. E. A section near the portal of the west tunnel is given.

Section at Cascade Coal Mine

	Feet	Inches
Sandstone	2+	
Coal		6
Coaly shale	4	6
Coal		2
Coaly shale		2
Coal		2
Coaly shale		4
Coal		3

By sorting, some coal has been obtained from the Cascade mine for local uses. Fossils, said to indicate Eocene age, were obtained from the dump.

CASEY PROSPECT (gold)**ILLINOIS RIVER DISTRICT****JOSEPHINE COUNTY**

With reference to this property, Diller says:

On the west fork of Rancherie creek, at an elevation of about 3,200 feet and nearly 11 miles in a direct line northwest of Kerby, a group of 6 claims is being actively prospected. The openings are near the contact of greenstone and serpentine, and a soft black deposit rich in pyrite has attracted attention on account of its rapid oxidation and the development of heat when exposed. The material had not been assayed at the time of my examination, but when panned and treated with nitric acid to remove the pyrite it yields numerous colors. The serpentine shows some copper stains, and the decomposed greenstone deeply covering the hill slope is said to pan well in free gold. Assays of the ore by a local assayer are said to indicate a content of \$60 a ton. Water is being turned on this property to wash the crushed material at the contact.

CASTEEL MINES COMPANY (placer)**DOUGLAS COUNTY**

Local name, Casteel mine.

Office: 1500 Vincent Ave., Portland, Oregon. C. N. Johnson, Gaston, Oregon, Pres.; George W. Peterson, 1500 Vincent Ave., Portland, Sec.; Allen W. Smith, Electric Bldg., Portland, Treas. Capital stock, \$100,000; par value \$1.00; \$94,000 subscribed, issued and paid up. (1915 report).

This company owns 160 acres of placer ground in Secs. 14, 15 and 22, T. 28 S., R. 4 W., 12 miles east of Myrtle creek. The company has worked these claims for the last 4 years and has taken out enough gold to pay all expenses, which included such work as ditches and flood dams. The mine is equipped with 2 large giants and 1200 feet of good pipe and all necessary tools for mining. Two men are employed at the mine the year around. Shortage of water is the only drawback. The company plans to build a large ditch 15 miles long, which will take in some 10 or 12 small creeks, and with plenty of rain or snow will be able then to run 7 or 8 months every year. Large bones and tusks of animals and many shells have been washed from the gravels. The mine has always paid well and some large gold nuggets have been taken out in the last 2 years which ranged from \$3 to \$25 each.

The above information is furnished by J. F. McCormick, a stockholder.

CATTON'S CLAIM**GOLD HILL DISTRICT****JACKSON COUNTY**

See "Coster & Catton's claim."

CENTRAL OREGON MINING COMPANY (mercury) OCHOCO DIST. CROOK COUNTY

Office: 446 E. 58th St., Portland, Oregon. Levi Tillatson, 314 Failing Bldg., Pres.; E. S. Huckaby, 446 E. 58th St., Sec.-Treas. Capital stock, \$10,000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company has 3 claims on Lookout mountain, the Eldorado, Leroy and White Star.

These names are the same as those of the American Almaden Quicksilver and Gold Mining Company. Three flasks were produced in 1915. The Central Oregon Mining Company is apparently an operating company. There was a small force of men at work in the fall of 1916.

CENTRAL OREGON OIL AND GAS COMPANY (Idaho corporation)

Office: Boise, Idaho. J. C. Turney, Burns, Oregon, Pres.; William R. Litzenberg, Portland, Sec.; C. H. Feldman, Portland, Treas.; G. W. Allen, Portland, attorney-in-fact. Capital stock, \$1,500,000; par value \$1.00; \$1,244,865 subscribed and issued; \$320,394 paid up. (1916 report).

CHATTY MINE (gold)**ILLINOIS RIVER DISTRICT****JOSEPHINE COUNTY**

Concerning this mine, Diller says:

The Chatty mine is situated in Days Gulch, nearly 5 miles northwest of Kerby, at an elevation of 3,160 feet. The country rock is greenstone and is much decomposed near its contact with serpentine, where the original owner some years ago found a rich pocket which is reported to have yielded approximately \$8,000.

The mine was worked to a depth of 30 feet before it came into the hands of the present owner, who has run a tunnel 110 feet to a fault with a well-defined gouge, but no valuable ore is yet in evidence. The fault runs N. 4° W. and has a steep dip to the west, being approximately parallel to the adjacent contact between the greenstone and serpentine.

This pocket, of small extent, was in oxidized material and its contents were completely removed some years ago. Early prospectors found traces of gold on the surface. Later these traces were followed to a depth of 15 or 20 feet into the oxidized rock, where in the rich pocket the quartz veins were found rusty and black. The quartz in the vicinity is porous, and where compact between the cavities is fairly rich in pyrite. The cavities are lined with quartz crystals, generally coated with limonite like that filling the late fissures in the rock. No free gold was seen with the quartz in any of the cavities, although pocket hunters of the region assert that such quartz is characteristic of pockets. An extension of the pocket has been sought for in all directions, apparently without avail, although the work continues.

CHETCO COPPER COMPANY (copper) CHINA DIGGINGS DIST. CURRY COUNTY

This company's property is located 8 miles west and a little north of Kerby, close to the Josephine county line. It was not visited, but Diller refers to the property as follows:

The same serpentine belt with which the copper deposits are associated on Fall and Rancherie creeks extends southwest by the head of Canyon creek to Chetco river, where a number of similar deposits occur and have been prospected by the Chetco Copper Company and others, by tunnels aggregating more than 250 feet. The ore appears to be mainly chalcopryite, but Dixon's prospect has furnished some native copper, and some remarkably beautiful specimens of the bright red oxide of copper, cuprite, in minute cubic crystals. A small amount of ore is said to have been shipped from this locality.

The company was dissolved January 7, 1911.

CHICAGO-VIRTUE MINING AND DEVELOPMENT COMPANY (gold)**VIRTUE DISTRICT****BAKER COUNTY**

Local name, Chicago-Virtue, formerly the Barry property.

V. P. Dole, Pres., Chicago, Ill.; L. Richey, Sec., Baker; James Meyers, Treas., Baker. (1916 report).

Located about 14 miles to the southeast of Baker in the northern part of Sec. 35, T. 9 S., R. 41 E., on low sagebrush covered hills. The country rock is argillite or greenstone and is much weathered on the surface. The vein is

narrow (the maximum width being about 8 inches) and has a strike of about N. 70° E., dip 85° S. It has been traced but a short distance along the strike.

The development work consists of a shaft about 100 feet deep on the vein, with a short drift 40 feet below the surface. There are also several small tunnels and open pits on the property. A 5-stamp mill has been nearly completed.

Very high values were claimed for this vein, but accurate sampling disclosed the fact that although very small bunches of specimen ore might be found, the average value of the quartz was extremely low.

CHISHOLM GROUP (mercury) GOLD HILL DISTRICT JACKSON COUNTY

This group, owned by Dr. W. P. Chisholm, of Rogue River, is located in Secs. 17 and 20, T. 34 S., R. 2 W. Considerable development work has been done on this property and some high grade cinnabar ore has been uncovered. Some retorting was done during the year on ores taken out during the development and several flasks of quicksilver have been sold.

(COLLIN) CHISHOLM (gold and copper) NEW ELDORADO DIST. GRANT COUNTY

This property is located on a shear zone, which is mineralized in places. Pyrite is the chief ore mineral. Pyrrhotite and some chalcopyrite are also present. This zone strikes about N. 60° E., and appears to be somewhat similar to those on the southern slope of the Wallowa range, of which the Poorman is a type, although the shearing and percentage of copper is much less. How much gold and silver per ton is present in this claim was not learned.

CHLORIDE MINE (silver and gold) GREENHORN DISTRICT GRANT COUNTY

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.

CHROMITE DEPOSIT COLLIER CREEK DISTRICT CURRY COUNTY

On the top of the ridge above Little Meadow camp, about 2 miles south of Collier butte, are numerous fragments of chromite float. They lie on serpentine not far from its contact with Dothan shales, and are sufficiently large and numerous to indicate the existence of one or more ore bodies of considerable size in that vicinity. A general sample taken from a number of fragments proved on analysis to contain 48.09 per cent chromic oxide, 16.44 per cent iron, 19.78 per cent silica, 8.12 per cent alumina, a trace of titanium, and no magnesium.

CHROMITE MINES CANYON DISTRICT GRANT COUNTY

South and east of Canyon City there are several outcrops of chrome iron ore, but the largest deposit, which was being developed in the late summer of 1916, is located about 4 miles southeast of Canyon City at the head of Quartz gulch and about 17 miles from the railroad at Prairie City. The property belongs to Joe Beggs and Chas. McCorkle, of Canyon City, and has been leased on a royalty basis to the Farrish Company, of San Francisco, with W. C.

Lummis in charge of operations. The deposit outcrops for several hundred feet and the maximum width is at least 30 feet. It is estimated by the owners that this one deposit contains at least 60,000 tons, which can be easily quarried and loaded into wagons for shipment to the iron furnaces in the vicinity of Pittsburgh, Pa., to be used in the manufacture of chrome steel. A wagon road was completed in September to the lower part of the outcrop, and press reports late in September state that the superintendent was busy engaging teams and men, and it was estimated that it would take about 125 horses to haul the ore to the railroad at Prairie City. Press reports late in November state that 60 tons of ore per day were being delivered at Prairie City.

(A. P.) CHURCHILL PROPERTY (gold, etc.) BOHEMIA DIST. LANE COUNTY

Owned by A. P. Churchill. Consists of 11 claims located near the corner of Secs. 23, 24, 25 and 26, T. 23 S., R. 1 E., on President creek, about 3 miles to the south of Bohemia postoffice, which is about 15 miles southeast of Disston, the terminus of a 20-mile branch railroad from Cottage Grove.

The country rocks are andesite, dacite and volcanic breccia. The main lode strikes N. 60° W., with a dip of 45 to 50° south. The average width is from 3 to 4 feet, and it is said to have been traced on the surface for 1400 feet. The ore minerals are galenite, sphalerite and a small amount of chalcopryite, and in one cut stibnite is present.

The development work consists of open pits and short tunnels. No definite information of values are available, but good values are said to have been obtained from the oxidized portion of the zone.

CINCINNATI MINING COMPANY

BAKER COUNTY

Office: Baker, Oregon. L. G. Lilley, Pres.; C. T. Godwin, Sec.; James H. Nichols, Treas., all of Baker, Oregon. Capital stock, \$500,000; par value \$1.00; all subscribed, issued and paid up. (1913 report).

This company held under contract 13 claims upon Pedro mountain, in Rye Valley mining district, owned by Jack Regan and I. R. McCord, but terms of contract were not fulfilled. Owners are recovering the property. Other assets not known. This information given by treasurer. Dissolved by proclamation in January, 1917.

CINDERELLA MINING COMPANY (gold-silver) BLUE RIVER DIST. LINN COUNTY

Local name, Great Eastern mine.

Office: Halsey, Oregon. W. J. Ribelin, Pres.; H. C. Davis, Sec.-Treas., both of Halsey. Capital stock, \$300,000; par value \$1.00; \$200,000 subscribed, issued and paid up. (1916 report).

Property consists of 7 claims, situated in the southern part of T. 15 S., R. 4 E. Trail about 1 mile to mountain road; 2 miles south to Lucky Boy mine; fairly good road to Blue River postoffice, and from Blue River to Eugene, 45 miles, road is in good shape.

The country rock is andesitic breccia. The deposit consists of a quartz vein about 2 feet wide, having a N. W.-S. E. strike and dipping at a high angle. This vein has been developed by tunnels and raises.

No definite information is available as to the value of ore exposed. A careful and systematic sampling of the vein matter would be very useful in directing further development work.

There is a small 3-stamp mill on the property.

CINNABAR DEPOSITS (mercury)

CANYON DISTRICT

GRANT COUNTY

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 1915-1916 caused them to be relocated and some development has been done by drifting to search for commercial grades of cinnabar.

CLACKAMAS MINING AND MILLING COMPANY (gold)

OGLE CREEK DISTRICT

CLACKAMAS COUNTY

Office: Oregon City, Oregon. E. H. Carlton, Pres., Canby, Oregon; C. D. Latourette, Sec.; D. C. Latourette, Treas., Oregon City. Capital stock, \$1000; par value \$10; all subscribed, issued and paid up. (1916 report).

This company owns 3 claims on the north side of Henline mountain at the headwaters of the south fork of Molalla river, in about Sec. 10, T. 8 S., R. 4 E., near the Ogle Mountain mine, reached by a poor wagon road 35 miles east from Silverton. The property can also be reached from Gates on the S. P. railroad by good wagon road for 10 miles northeast to the Silver King mine, then 4 miles by trail over the divide to the north.

The ore deposit at this property is reported to be similar to that of the Ogle Mountain Mining Company's property, and developed by a few short tunnels and open cuts.

CLEVELAND CLAIM

ASHLAND DISTRICT

JACKSON COUNTY

For description see "Snapshot Claim."

CLEVELAND DEVELOPMENT CO. (gold) MORMON BASIN DIST. MALHEUR CO.

Local name, Cleveland mine.

Office: 408 Buchanan Bldg., Portland, Oregon. Wm. P. Chapman, Pres., 882 Belmont St., Portland; H. G. Patterson, Sec., F. C. Graf, Treas., both of 408 Buchanan Bldg., Portland. Capital stock, \$250,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company has 15 claims located near the center of T. 13 S., R. 43 E. about 1 mile south of the Rainbow mine.

Country rock is schistose argillite or greenstone capped by recent lake beds. Development work consists of 2 tunnels and several pits. The lower tunnel (several hundred feet long) was driven first through lake beds then reaching schistose argillite or greenstone and in the summer of 1916 was being driven along a porphyry dike (probably granodiorite) which contained a few quartz seams. This dike but a few feet wide has a strike S. 75° W. and dips steeply to the south. This property has other showings about a mile from the principal workings which were not visited.

CLIFF MINE (gold and tungsten)

VIRTUE DISTRICT

BAKER COUNTY

This property, owned by Bradbury brothers, is located about 5 miles northeast of Baker, approximately 1 mile north of the Flagstaff mine, at an elevation of about 3600 feet. The property is developed by a shaft to a depth of about 300 feet and was developed as a gold prospect, but in 1916 attention was called to the presence in the ore of scheelite, an ore of tungsten. The property was leased in April, 1916, to F. S. Baillie, former manager of the Columbia mine and at present manager of the Baker Mines Company, who proceeded to prospect the property. Later on W. E. King, of the Rainbow mine, to whom the lease was assigned by Mr. Baillie, opened up the caved shaft so that an inspection and sampling of the lower level could be made. At the time the property was visited the retimbering of the shaft had not been completed, so no underground examination could be made.

CLIMAX MINE (gold)

CRACKER CREEK DISTRICT

BAKER COUNTY

Situated about 1/2 mile north of Columbia mine on Fruit creek. Has a small crusher and one stamp on property. Reported not active.

COBALT GROUP (gold-silver-cobalt) ILLINOIS RIVER DIST. JOSEPHINE COUNTY

This group of claims is owned by Frank Berry, of Agness, and is situated at the base of Bald mountain on the east side of the Illinois river. Here is a serpentine hill about 800 feet high, 2 miles long, and two-thirds of a mile wide. It looks like a slide, but as Bald mountain is composed of different material, the serpentine is doubtless in place.

The serpentine is practically free from overburden, and great patches of it are heavily iron-stained at the surface. It has been opened by means of numerous cuts and shafts, and it is claimed that all these openings run into sulphides, principally pyrite, at no great depth. It is stated that independent examinations showed that the ore ran on an average about \$10 a ton in gold and silver, and that other elements present, including copper and cobalt, brought the total value to between \$15 and \$16 a ton. The quantity of ore available is certainly enormous, and if the figures quoted prove correct, it ought to be possible to develop a mine here. It was impossible, because of limited time, to visit more than a few of the openings. From one of these in which many feet of solid pyrite was exposed, a sample was taken which assayed not a trace of gold. Another sample of the porous, iron-stained gossan yielded the same result. From this, it is evident that all the mineral is not gold-bearing, but there are so many exposures and the mineralization has been so extensive that it is not unlikely large bodies of good ore exist elsewhere on the hill.

COEUR D'ALENE DEVELOPMENT COMPANY**IDAHO**

Office: City Hall, Saratoga, N. Y. E. T. Brackett, Saratoga, N. Y., Pres.; Wm. E. Benton, Saratoga, N. Y., Sec.-Treas. Capital stock, \$100,000; par value 10 cents; all subscribed, issued and paid up. (1915 report).

This company's properties are located in Shoshone county, Idaho.

COLE CLAIMS (copper)**HOMESTEAD DISTRICT****BAKER COUNTY**

These claims are located in a branch gulch less than a half mile west of the river from Ballard's landing in Sec. 10 T. 6 S., R. 48 E. The country rock is an altered volcanic breccia containing some chalcopyrite. The chalcopyrite is in fair sized grains and in minute reticulate veins. Much secondary quartz and chlorite are present. A vein about 1 foot wide is being followed with the expectation, after some further work, of reaching one of much greater width, which is said to outcrop upon the hill.

COLD SPRING MINE (copper)**GALICE DISTRICT****JOSEPHINE COUNTY**

With reference to this property Diller says:

The Cold Spring copper mine lies on the southwest slope of the West Fork of the Galice creek nearly opposite the Sugar Pine. It was lately examined in detail under option by the Almeda Company and half a ton of ore shipped for test. Although I did not see the mine, Mr. Daniel Green informs me that large bodies of copper ore, chiefly chalcopyrite, is in sight. The ore is said to be of good grade, but it has no associated galena, as at Sugar Pine.

COLLIER CREEK COPPER COMPANY COLLIER CREEK DIST. CURRY COUNTY

This property includes a number of claims running from the neighborhood of Horse Sign butte southward, approximately 10 miles south from Agness.

Mr. Frank Berry, of Agness, is either the sole owner of this property or else possesses a controlling interest. Most of the work on the property was done 20 years ago, and the only openings now accessible consist of open cuts and shallow shafts.

The principal mineralized zones on the property are known as the Collier creek vein, the Eagle vein, and the Mohawk vein. Of these, the first is the most persistent, and is exposed in an open cut about 300 yards somewhat east of south of Burt camp over a low divide, as well as elsewhere. This

deposit is of the shear-zone type in serpentine, and contains a number of boulder-like masses of iron and copper ores. One hundred feet or less west of the zone, and parallel to it, is a dike of dacite-porphyry, while east of the zone lies comparatively unaltered peridotite. The mineralized zone itself averages about 4 feet wide, and the outcrop consists largely of limonite or limonite-stained serpentine. At many points the gossan is very porous and highly ferruginous, so the zone, which strikes S. 25° W., is easily traceable on the surface. At some points, however, the iron-stain disappears, giving place to a mass of serpentine containing numerous bluish or black veinlets.

Many fragments of good looking copper and iron ore occur in the various dumps along this zone, but most of these have been exposed to the weather so long that a considerable portion of their copper contents has doubtless been leached out. Analyses running as high as 30 per cent copper are said to have been obtained from the freshly mined ore.

The Mohawk vein appears to be an off-shoot of the Collier creek vein. It leaves the latter in the saddle just south of Burt camp, finally disappears under Horse Sign butte, and strikes about N. 10° E. Like the Collier creek vein, the Mohawk is paralleled to the west by a ledge of dacite-porphyry. The two zones are in fact decidedly similar in most respects, but the Mohawk is marked by association with a dark-brown serpentine instead of with the greenish material commonly found in connection with the Collier creek vein.

A fairly fresh sample taken from a small cut on the Mohawk vein was found to consist of magnetite (magnetic oxide of iron), cuprite (red oxide of copper), and malachite (green carbonate of copper); and proved to contain 9.87 per cent copper and traces of gold and silver. Another sample of extremely porous, heavily iron-stained gossan from an outcrop of this vein yielded not a trace of copper, gold or silver.

The Eagle vein, probably an off-shoot of the Collier creek vein, is best exposed just south of the saddle west of Horse Sign butte. A fairly deep shaft at this point exposes a great deal of copper-stained serpentine. The material now on the dump looks low-grade, but the prospect is said to have produced at least one nugget of native copper weighing 26 pounds.

This company was dissolved January 3, 1912.

COLLINS MINE (placer)

GOLD BEACH DISTRICT

CURRY COUNTY

During the winter of 1914-15, A. M. Collins, of Agness, worked a black sand deposit on ground owned by the Wedderburn Trading Company, about 4 miles north of Wedderburn. He says the deposit is in an old beach about 30 feet above the present water level, and consists of from 12 to 18 inches of nearly pure black sand containing good gold and platinum values, with several feet of lower grade material above, which was separated from the lower streak by 2 to 3 feet of low-grade gray sand. He caught the gold on canvas tables, and, in spite of the fact that he had to pay 30 per cent royalty to the owners of the ground, he succeeded in making good wages throughout the winter.

COLLINS CLAIMS

UPPER APPLGATE DISTRICT

JACKSON COUNTY

See "Moses & Collins" claims.

COLUMBIA COAL AND COKE COMPANY

WASHINGTON

Office: Corbett Bldg., Portland, Oregon. A. S. Nichols, Pres.; J. K. Kollock, Sec.; H. S. Nichols, Treas., all of Corbett Bldg., Portland, Oregon. Capital stock, \$60,000; par value ten cents; all subscribed, issued and paid up. (1916 report).

This company's properties are located in Lewis county, Washington.

COLUMBIA GOLD MINING COMPANY (gold) CRACKER CREEK DIST. BAKER CO.

Local name, Columbia mine.

Office: Sumpter, Oregon. Edward W. Backus, Pres.; Wm. F. Brooks, Sec.; R. L. Horr, Treas., all of Minneapolis, Minn. Capital stock, \$150,000; par value \$100; all subscribed, issued and paid up. (1916 report).

The lands of this company consist of 2 claims upon the lode and other protective side claims. The mine is in Sec. 32, T. 8 S., R. 37 E., at an elevation of 5500 feet, on Fruit creek, a branch of Silver creek, which flows into Cracker creek, a tributary of Powder river, at Sumpter. The mine is 6 miles north from the Sumpter Valley railroad (narrow gauge) at Sumpter and about 1000 feet above the town, and in a well timbered area, except close in, where it has been used for mine timbers and fuel.

The following description taken from a previous report includes a description of the Golconda mine, the Taber Fraction mine, the E. & E. mine (Bourne Gold Mining Company), the North Pole mine and the South Pole mine. Sections treating of these properties will refer the reader to this description.

The North Pole-Columbia lode, roughly paralleling the Ibex, Bald mountain and Mammoth veins, and approximately a mile and a half southeast of them, is the most extensive gold lode in northeastern Oregon. It can be traced from near McCully fork northeast to Rock creek, a distance of about 6 miles, by its frequent and oftentimes prominent outcrops of brecciated argillite cemented together with quartz. Considerable development has been done upon many claims between McCully fork and Silver creek, among which are the Bunker Hill, Annalulu, Amazon, Mayflower and Mountain Belle, located upon the 2 branches of the vein which splits upon the Golconda property.

These claims just mentioned southwest of the Golconda, although having considerable development upon the lode, which is frequently very wide and highly silicified, have produced practically no ore. They have been either abandoned, patented and lying idle, or else development is confined to the annual assessment work.

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

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

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

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

By reference to the section showing the developed portion of the lode attention is called to the fact that the northeast or South Pole claims, which extend over to the Rock creek slope, includes the highest part of the lode, and is in close proximity to the granodiorite intrusion, which is about one-half mile north of the South Pole tunnels. This high ridge has dikes in great profusion. They become less frequent as one goes down the hill toward the

E. and E. shaft, although they are not absent even as far as Golconda ground.

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

In tunnels 5 and 3 of the North Pole mine, in the face of the Excelsior adit north on North Pole ground, in the Columbia, and in the Golconda, is found a greenish-white rock, which is probably a porphyry which has suffered extreme alteration and has been impregnated with pyrite. In thin sections of this dike material the feldspars are so badly altered as to be indeterminable. It is simply an aggregate of sericite, kaolin, secondary quartz, feldspar and chlorite. Field evidences, together with the examination of hand specimens and thin sections, indicate that this intrusion, found at various points in the vein over a distance of more than 3 miles, in which the various specimens are strikingly similar, was originally a granodiorite-porphyry. Its extreme alteration indicates that it came into the plane of the vein, although probably not in a continuous sheet, at a time previous to the formation of the vein.

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

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

The width of the lode in the Golconda as determined in the workings is about 175 feet in the upper levels, and about 100 in the lower. In the Columbia it is shown upon the surface to be about 75 feet wide, and averages about 28 feet on the 900-foot level. In the E. and E. the vein is as much as 30 feet wide. In the North Pole, although it has the wide exposure of white quartz above referred to, underground the lode shows from 7 to 40 feet wide, except one crosscut in No. 2 tunnel, which, according to the maps, is in quartz far more than 150 feet, indicating that the large exposure upon the surface above the portal of No. 4 tunnel may extend downward indefinitely in a sort of quartz chimney. The mine maps indicate that development in No. 1 tunnel below and between No. 2 and the surface, has been almost entirely confined to drifting, with but few crosscuts, so that this probability is not demonstrated. The foot-wall vein on the dike in the Yankee Jim crosscut is about 16 feet wide. A cave prevented the observation of the hanging wall vein in this same crosscut, but it is said to be several feet wide. Although the lower tunnel is 1200 feet long on the South Pole, practically no crosscutting has been done to determine the width of the lode, but it evidently will average more than 10 feet.

The walls of the lode on the North Pole ground are fairly well defined fault planes, especially the footwall. The Columbia is similar to the North Pole, the walls being fairly well defined. The Golconda is between 2 usually well defined walls.

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

That this wide zone is a normal fault, which has a vertical displacement of at least 400 feet and a horizontal displacement of approximately 1800 feet.

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

eastern Oregon, or some time in the later stages of the cooling of the Bald mountain intrusion.

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

The ascending hot solutions, besides the quartz, carried in solution and deposited with the quartz many different metallic sulphides. Those of much significance were arsenopyrite, pyrite, and to a lesser degree chalcopyrite. These sulphides, in which is practically all of the silver and gold, except in the shallow oxidized parts of the vein, are not disseminated throughout the lode's entire width, but occur in shoots upon one wall or the other, and occasionally at intermediate positions. Most of the massive quartz does not contain to exceed \$1 per ton in gold, while much of the less altered argillite is of low grade. The best values are more frequently contained in highly replaced argillite, and often bear a close relation to a gouge streak.

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

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

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

The form of the stopes in the sketches and drawings available to the general public has caused many to assume that the shoots so far stoped have been the result of a downward enrichment, but when a few facts are considered it is apparent that little downward sulphide enrichment occurs. The arsenopyrite, which carries the greater part of the gold, is a primary mineral, and is unknown as a secondary constituent of ores enriched by descending sulphate solutions. Very few occurrences of secondary pyrite have been reported from sulphide deposits in western United States, and chalcopyrite in the greater number of its occurrences is clearly primary. The gangue minerals are quartz and calcite.

As already stated, the gold is found in the arsenopyrite, the pyrite containing but low values of that metal. The arsenopyrite and quartz in many places show comb structure, thus indicating successive depositions of these primary minerals from ascending thermal solutions. Frequently whole masses of the first deposited quartz and arsenopyrite have been shattered and re cemented by a second deposition of quartz, which contains pyrite. Another

phase in the mineralization that often occurs is a further brecciation and the filling of the minute fractures with calcite. Pyrite and arsenopyrite, which are characteristic of the lower vein zone, occur with the calcite. All of these successive mineralizations are the product of ascending hot waters. It would be rather difficult to account for the mineralization of the vein by the process of downward enrichment due to the occurrence of oxides of manganese found in some parts of the lode, which has been used by some as evidence favoring the downward enrichment theory. The presence of calcite occurring as the last phase of mineralization was overlooked, and it is, of course, a well known fact that this mineral will nullify the dissolving action of manganese upon gold.

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

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

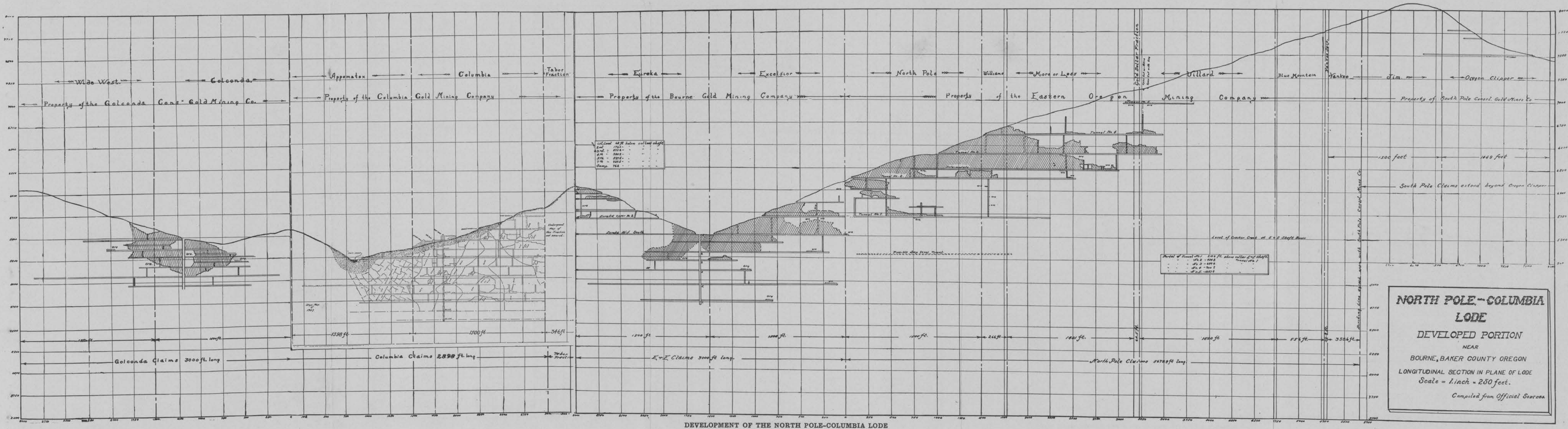
A casual examination of the underground workings, together with an inspection of the plans of the 5 mines located upon the developed portion of this lode, brings out the fact that with the exception of the Columbia, but little systematic crosscutting has been done on the various levels of the several properties.

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

It will be also noted that there are 2500 feet on the North Pole hill between tunnel No. 5, on the North Pole, and No. 3, on the South Pole, which has had no drifting in the lode. It will also be seen that No. 1 tunnel on North Pole ground, which has no crosscuts, does not extend underneath the full length of the shoot above. Between the E. and E. shaft and the apex of the ridge, and above its 7th level, there is a million square feet of lode without development, above which there has been over a greater part of the distance ore extracted or evidences of it discovered as the result of widely separated prospect holes.

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

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



February 1, 1903, to February 1, 1904. The Columbia secures the highest extraction of any, although the exact figure is not available for publication, but owing to the nature of the milling plant it is necessarily low.

The Golconda, Columbia and E. and E. mines are equipped with 20-stamp mills; the North Pole has a 30-stamp mill. The average daily tonnage capacity for the 20-stamp mills probably was below 50 tons, with a probable present maximum of 2000 tons a month at the Columbia, while the tonnage capacity for the 30-stamp mill did not exceed 65 tons daily throughout any one year.

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

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

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

The improvements in these processes have been accomplished within the last two or three years, while the Golconda, Taber Fraction and E. and E. mines ceased operations 9 years ago, and the North Pole mine 6 years ago, which leaves the Columbia as the only steady producer since the North Pole closed down in 1908.

The Columbia mine is owned by 4 persons, with one of their number, Frank S. Baillie, as manager of the property. Under the efficient management of Mr. Baillie, who has been in charge of the property for 18 years, this company has never delayed a pay day a single day; it was for some time during this period the only steady producing quartz mine in Oregon. The owners naturally feel that a property which has eclipsed all others in the state in steadiness of operation and production, in conservative and successful management, should hesitate to make radical changes in methods which have been and are now successful. They realize that to effect a 90 per cent or more extraction at this mine would require extensive alterations in and additions to the present mill, which would involve the expenditure of considerable sums and would absorb their dividends for some time. The above reasons doubtless have had much to do with the failure of the stockholders to authorize the manager to make such extensive improvements.

A proper consolidation of these properties is an economic necessity for most of them and would be highly beneficial to all. Attempts to consolidate the leading properties have been made by some of the owners, as well as by outside interests, but for one cause or another have been unsuccessful. The usual difficulties have arisen when consolidation of properties is attempted where parties at interest attempt to set prices and make terms each upon his own.

An agreement could be made by the parties at interest to have all their

properties examined and valued by a committee of three thoroughly competent engineers, who would report upon ore blocked out upon three or more sides, upon probable and possible ore, upon a new milling plant, and those parts of the surface plant, including water rights and equipment, which would be of value to the consolidation. The new organization would then be in a position to purchase from the individual owners, paying each company for their ore reserves on a basis of the net profits which would be secured in their individual plants.

The ore blocked out on 3 or more sides, although too low grade to mine in separate mills, would nevertheless pay in a consolidated new mill, and should therefore secure to the individual company possessing it some consideration other than stock.

A fair valuation of the separate properties in addition to the reserves and useful equipment, as determined by the committee of engineers, could be paid for in stock of the consolidation.

Aside from the amount of stock issued in payment for the individual properties, a sufficient amount should be placed in the treasury to be sold to meet the obligations to pay for the ore reserves under the terms above given and to supply an adequate sum to develop additional ore reserves and to construct a proper reduction plant when sufficient development work has been done to determine the size of plant which should be installed.

The ore actually blocked out in the Golconda and North Pole mines is small. The actual number of tons and value per ton fairly well blocked out in the E. and E. mine is not available, but a statement from the office of the company states that there is \$500,000 worth of ore blocked out. This estimate probably refers to ore which could be treated at a profit in their present plant. There may be a much greater tonnage of ore averaging \$5 or \$6 which could probably be treated at a profit in the mill of the consolidated company. It is officially stated that there is 100,000 tons of \$10 ore blocked out on 3 or more sides in the Columbia mine, and that the conditions with reference to ore on the 900-foot level are identical with those on the 600, 700 and 800-foot levels. No official statement is made as to the tonnage of ore blocked out which would be available in a new mill, but a reference to the sectional elevation of the mine, together with statements from persons not connected with the company, leads one to believe that this tonnage is large.

The North Pole mine is owned by Baring Brothers, of London, and is at present under bond and lease to John C. Lewis, of Portland, Oregon. The Bourne Gold Mining Company, owner of the E. and E. mine, is owned by ex-Senator Jonathan Bourne, Jr., and associates, of Portland, Oregon. The Columbia mine, officially known as the Columbia Gold Mining Company, is owned by Edward W. Backus and two other men, of Minneapolis, Minn., and the fourth owner is Frank S. Baillie, of Sumpter, Oregon, the managing engineer. The Golconda mine is owned by Mr. C. S. Jackson, the well known publisher of the Portland Daily Journal, Portland, Oregon.

The owners of these properties are practically all men of affairs actively engaged in banking, publishing, politics and industry. Their multiplicity of interests causes all but one property to be kept idle. Their chief interest lies not in mining, and their experiences in it were for most of them secured during a period when close valuations upon mining properties were much less common than now, and the experienced engineer, metallurgist and mining geologist, now so prominent in the operation of successful mining companies throughout the world, had then but a small part in operations. A failure to fully realize that experienced technical men can solve their problems of mining and milling keeps some of them from operating their properties themselves, and the experience of some of them during the time when the element

of adventure existed to a greater degree than now causes some to over-value their property when considering its sale.

With the exception of a limited amount of development in the last 2 or 3 years at the North Pole mine, the properties other than the Columbia have kept only a watchman. Mine openings are not permanent ones. They have a considerable annual depreciation, and most of them, if left idle for a decade or two, will become nearly a total loss. The only factors which increase the value of known bodies of ore are a reduction in the cost of and an increase in the percentage of extraction. But the idle property, with its rapid depreciation in the value of mine openings and the loss of returns upon capital invested during the period of idleness, will in future vastly exceed any gain from improvement in processes. It is to be hoped that a proper consolidation will be early effected before some of these good properties become an almost total loss.

Since the above was written in December, 1914, O. D. Glover succeeded to the management of the Columbia mine which had been under Mr. F. S. Baillie's management for about 20 years. The company continued operation of the mine and mill as usual until October 15, 1916, when according to press reports the mill closed down; Mr. Glover retired from the management, and only a small crew is to remain at the mine in charge of the foreman.

COLUMBIA MINES COMPANY (placer) GREENBACK DIST. JOSEPHINE COUNTY

Local name, Columbia mine.

Office: 40-54 Front St. N., Portland, Oregon. L. A. Lewis, Portland, Pres.-Treas.; A. M. Compton, Portland, Sec. Capital stock, \$20,000; par value \$100; all subscribed, issued and paid up. (1916 report).

The Columbia placer is located in Sec. 32, T. 33 S., R. 5 W., and is reached by wagon road $1\frac{1}{2}$ miles north from Placer Oregon. It is supplied with water by two ditches from Grave creek, one giving a head of 100 feet and the other of 600 feet. The deposit occupies the valley of Tom East creek, a tributary of Grave creek, heading near the Greenback mine, and the workings have now nearly reached the Greenback mill. The gravel attains a thickness of 50 feet and is coarsest near the bedrock, which is largely greenstone like the boulders. According to Diller:

The gold is fine and nuggets are rare. Three 5-inch giants are in use and nearly 6 acres are washed over annually. The grade is low and to keep the sluice clear the tailings are washed aside from the end of the sluice by a powerful side stream which piles up the gravel in a prominent heap.

Several other placers have been in operation both above and below the mouth of Tom East creek on Grave creek for at least 30 years, more or less continuously, and it is estimated that the gulch has made an aggregate yield of more than \$400,000 in gold.

The property is now under lease by Crook Epperly, of Placer, Oregon.

COLUMBINE CLAIM ASHLAND DISTRICT JACKSON COUNTY

The Columbine claim, about 3 miles southwest of Ashland, and west of Wagner creek, in Sec. 14, T. 39 S., R. 1 W., is owned by R. W. Dunlap. It is opened at an elevation of about 2600 feet by an adit crosscut in diorite running S. 84° W. 85 feet to the vein on which a drift extends N. 36° W. about 100 feet. The vein contains 4 to 6 feet of massive white quartz with some pyrite and a little marcasite and chalcopyrite, and some fault gouge; it dips 55° N. E. The vein seems to contain also a little pyrolusite. The marcasite alters rapidly under atmospheric conditions producing sulphuric acid and iron sulphates, especially melanterite.

COMBINATION MINES COMPANY BOHEMIA DISTRICT LANE COUNTY

Office: Bohemia, Oregon. R. H. Clark, Eureka, California, Pres.-Treas.; W. J. Disch, Milwaukee, Wis., Sec. Capital stock, \$450,000; par value \$1.00, all subscribed and paid up; \$250,000 issued. (1915 report).

COMER MINES COMPANY (gold) QUARTZBURG DISTRICT GRANT COUNTY

Local name: "Present Need Mine."

Office: Board of Trade Building, Portland, Oregon. E. D. Brigham, Chicago, Ill., Pres.; M. M. Wasley, Chicago, Ill., Sec.-Treas. Capital stock, \$1,500,000; par value \$5.00; \$1,100,030 subscribed, issued and paid up. (1913 report).

This company's property is located in Sec. 2, T. 12 S. R. 33 E., 7 miles northeast of Prairie City on Dixie creek. The vein strikes N. 20° E. and dips 70° E. S. E. The width is two to three feet in hard diabase rocks. The ore occupies from four inches to two feet of this width and consists of solid quartz with heavy sulphides in an irregular intergrowth. These sulphides are pyrite, hard and yellow, softer yellowish gray marcasite, a little chalcopyrite, zinc blende and galena. Ore values in gold and silver are about \$100 per ton and free gold is almost altogether confined to the oxidized part of the vein. There are two ore shoots each about 70 feet long separated by a barren zone of about the same length. The mine has been developed to the creek level by crosscut and drifts upon the vein but the developed ore is practically exhausted to the creek level.

Dissolved by proclamation, January, 1917.

**COMMERCIAL MINING COMPANY (gold)
MORMON BASIN BAKER AND MALHEUR COUNTIES**

Local name: "The Rainbow mine."

Office: 214 Chamber of Commerce building, Portland, Oregon. F. P. King, Pres.; H. V. Carpenter, Sec.-Treas., both of Portland. Capital stock, \$1,750,000; par value \$1.00; \$1,666,000 subscribed, issued and paid up. (1916 report).

This is the principal mine of the district and is situated practically on the divide between Dixie creek which flows into Burnt river and Willow creek which empties into the Snake river. This property which consists of 11 claims, is located in the central part of T. 13, S. R. 42 E. and is 28 miles by wagon road west from Huntington and 24 miles southwest from Durkee.

The pay streak in this mine was discovered about 15 years ago and was partially developed and equipped by the present owners who sold the property to the United States Smelting, Mining and Refining Company, who operated the mine for 32 months under the terms of a special contract given them.

Previous to 1911 the mine produced for the Commercial Mining Company \$242,000. In the 32 months the property was operated by the U. S. S. M. and R. Company bullion to the value of \$1,083,360 was produced from 95,747 tons of ore, an average of \$11.40 per ton extracted, the assay value of which was approximately \$12.00.

December 1, 1915, the mine reverted to the Commercial Mining Company and has been operated steadily and very profitably ever since.

The geology of the Rainbow mine is comparatively simple, the country rocks are chiefly slate with some granitic intrusives on the hanging wall side and some limestone and greenstones on the foot wall side. The greenstone is an intensely altered rock with an excessive development of secondary hornblende; its original character is difficult to make out.

The vein fissure has a strike of N. 60° E. and in the upper levels a dip of 66° N., while in the lower levels a dip of 54° N. Before the period of vein formation the fissure was filled with a porphyry dike locally known as the "spotted dike." A petrographic description of this rock is as follows:

It is dark brown and has a dense porphyritic texture. There are a few veinlets of quartz and minute reticulate veins of pyrite present. In thin section the predominant phenocrysts are badly formed feldspar crystals which

for the most part owe their irregular outlines to resorption, or partial melting after they were formed. In composition the feldspars are of the soda-lime variety and the few that were capable of accurate measurement were found to be andesine. Some show zonal growth to a certain extent, thus indicating a change in the composition of the magma. The ferro-magnesian phenocrysts are hornblende and hypersthene, both occurring in very badly formed crystals, and intergrown with them are small crystals of biotite, some grains of pyrrhotite, and a little magnetite. The groundmass is seen to be made up of very minute feldspar crystals with some quartz. The intergrowth of these minerals is in some places so close that it approaches a micrographic or micropegmatitic texture. The rock has suffered some alteration of the deep-seated type. Many of the feldspar phenocrysts show fracturing and sometimes a development of sericite in these fractures. Other alteration minerals present are: uraltic hornblende, secondary quartz, some actinolite, and a small amount of chlorite.

Judging hastily from the hand specimen alone one might possibly call this rock an andesite. But even then the dull appearance and irregular outlines of the majority of the feldspar phenocrysts are indicative of its intrusive rather than extrusive nature. In thin section the mineral composition at a hasty glance might also appear to be that of an andesite. But, on closer inspection the amount of primary quartz in the groundmass, the microgranitic texture even approaching micrographic in places, and the predominance of feldspar make it clearly evident that this rock is a porphyry genetically related to an intrusive magma that is probably a basic granodiorite or quartz-diorite or perhaps even a diorite in composition. Of course the structural occurrence of this rock is that of an intrusive dike and for this reason unless it were evident that the dike was a feeder to an andesite flow it could not be called an andesite.

The Rainbow vein is not of the fissure type but of the brecciated zone type. The fractured zone varies from a few feet in width in some places to over 50 feet in others. It is made up of fragments of country rock cemented by quartz. The porphyry dike is included in the brecciated zone to a large extent. The foot wall vein of the lode is the best developed and has been the most worked. The hanging wall vein is flat-dipping and branches away from the foot wall or main vein in both strike and dip. The terms "foot-wall" and "hanging wall" in referring to these veins refer only to their positions with reference to the "spotted dike." The vein quartz is fine-grained and contains but a very small amount of arsenopyrite and pyrite in which there is some gold. Some of the free gold in the vein is large enough to be distinctly visible, but for the most part it cannot be seen. A small amount of actinolite and a little chlorite occur with the quartz, and when these minerals are present the gold values are said to be greater. This is noteworthy, as it points toward the precipitating action of the ferro-magnesian silicates.

There has been some movement since ore deposition, as is shown by the gouge and slickensides. The quartz, however, is not fractured to any great extent.

The genesis of this vein is simple, that of ascending thermal solutions from the underlying magma. The presence of the porphyry dike shows that the vein fissure followed this line of weakness.

The mine is worked through a vertical shaft about 400 feet deep. Most of the development has been done on the 200 level, where the vein has been drifted upon for 1700 feet, and much development upon the 3rd and 4th level has also been done, which is being increased every month. Mine and mill are operated by electricity, with power furnished by the Idaho-Oregon Light and Power Company.

The mill has 15 stamps and handles over 100 tons a day. Forty-five per cent of the gold is free milling. The stamps crush to about 12 mesh, from which

the pulp goes to a tube mill. From the tube mill it passes over amalgamating plates and then to a Dorr classifier. The sands are returned to the tube mill for regrinding, from which the pulp goes to the Dorr thickener and then to Pachuca tanks. After agitation in cyanide solution the pulp goes to a Kelly filter press, from which the cake is sluiced to the tailing pond and the clear solution going to gold solution tanks. Precipitation is made with zinc dust and a Merrill filter press is used. The mill is very compact and is a model for this type of ore. The recovery is about 97 per cent. In addition to the mill there is a complete assay and experimental laboratory and also furnaces for refining the precipitate and bullion.

COMPTON MINE (gold)**SUSANVILLE DISTRICT****GRANT COUNTY**

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.

CONNOR CREEK MINES**CONNOR CREEK DISTRICT****BAKER COUNTY**

Local name, The Connor Creek mine.

Office: Home, Oregon. Clayton Mark, Chicago, Ill., Pres.; J. H. Bagley, Home, Oregon, Sec.-Treas. Capital stock, \$100,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

The Connor Creek Mining and Milling Company in the spring of 1915 gave a bond and lease on their 6 patented quartz claims to the above company. The Connor Creek Mines also have 5 placer and 5 quartz claims adjoining.

The present development work consists of opening up some of the upper workings and the No. 4 tunnel. It is the intention to drive this level beyond the last break and so pick up the vein in country which has not been explored. A 10-stamp mill has been built at the portal of the tunnel. There has been a production of \$4000 incidental to development work. Press reports of December, 1916, state that bullion valued at \$21,000 had been brought in as the result of a short run upon rich ore recently discovered.

For general description of the property, see Connor Creek Mining and Milling Company.

CONNOR CREEK MINING AND MILLING COMPANY (gold)**CONNOR CREEK DISTRICT****BAKER COUNTY**

Local name, The Connor Creek mine.

Office: 426 Abington Bldg., Portland, Oregon. T. L. Eliot, Pres.; A. H. McGowan, Sec. Capital stock, \$500,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

The Connor Creek mine is situated on Connor creek about 2½ miles northwest of the Snake river. It is one of the oldest mines in Oregon, the vein having been discovered in 1871. The total production is approximately \$1,250,000. The immediate country rock is a black slate, which has a general north-northeast strike and dips about 60° west-northwest. The vein strikes about N. 40° W. and dips 70 to 75° southwest. The average width is 3 to 4 feet. The value of the milling ore was from \$3 to \$10 a ton, but several rich pockets were found in which coarse gold was associated with argentite. So much native mercury was contained in the ore at times that amalgamators had difficulty in maintaining a proper hardness of the plates.

The vein has been developed by 6 tunnels, the shortest of which is about 500 feet in length and the longest 3700 feet. At the present time most of these are caved. The stopes on all levels continue in a northwest direction until a fault is reached. This fault strikes N. 30° E. and dips 45 to 60° S. E.

The vein has been picked up on the other side of this fault, but has not been developed.

In the spring of 1915 J. H. Bagley, Albert Geiser and Isaac Sweet organized a company and were given a bond and lease upon the property. See Connor Creek Mines.

CONQUEST GOLD MINING COMPANY (gold) WEATHERBY DIST. BAKER COUNTY

Local name, Gold Hill mine.

Office: Shoemaker Bldg., Baker, Oregon. Mine office, near Durkee. James A. Panting, Pres.; A. H. Panting, Sec.-Treas. Capital stock, \$2,000,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

Four miles northeast of Durkee in Sec. 1, T. 12 S., R. 43 E., and Sec. 6, T. 12 S., R. 44 E., on north slope of Gold Hill, in rolling sagebrush hills—Burnt river drainage. Wagon road to Durkee, O.-W. R & N. station. Lands, 21 quartz claims and 164 acres of placer ground.

The veins upon this property are found both in granodiorite and schist. They are fissure veins, although when cutting schist considerable replacement has occurred. The several veins strike from east-west to 20° S. E., and vary from 2 to 10 feet in width. Several veins have been cut by a long crosscut, but the examination of much of the development was prevented by bad air. High values are reported in some of the veins, the higher values usually in the smaller veins.

There is a 10-stamp mill upon the property, in which some ore has been treated. Some work was done here in 1914 by Mr. Al Geiser, of Baker, in opening up the Spring Gulch, one of the smaller veins, which is nearest to the portal of the tunnel.

Amount of work done in 1914 was \$4000. Production was less than \$1000. Little is reported to have been done upon the property since 1914.

**CONSOLIDATED COPPER MINING AND POWER COMPANY
NORTH SANTIAM DISTRICT MARION COUNTY**

Office: Portland, Oregon. Hugh Freeland, Pres., Gates, Oregon; J. H. Colt., Portland, Sec.-Treas. Capital stock, \$200,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

It is reported that 67 per cent of the stock in this company is under option to Lotz and Larsen, and that the property consists of the "Minnie E.," the Electric Mining and Smelting Company's claims and the Freeland Consolidated Mining Company's ground, about 25 claims in all. These are on the Little North fork of the Santiam river at the mouth of Gold creek, in Sec. 19, T. 8 S., R. 5 E.

The property is 14 miles from Gates, one mile of which is trail and 13 miles wagon road.

The country rock is andesite. There are several veins upon the consolidated property, which are from one to several feet wide. There is about ½ mile of drifts and crosscuts, but the work which is being done (1916) is upon the "Minnie E.," on the south side of the river and close to the water's edge, where a drift 210 feet long upon a vein which strikes S.-S. E. and dips E. develops 3 or more feet of chalcopryite ore, containing 2 to 3 per cent copper and \$2.00 in gold. The ore upon that part of the property up Gold creek is said to contain 1 to 14 per cent copper and \$2.00 in gold per ton.

**CONSOLIDATED LUCKY BOY MINES COMPANY (gold, copper and lead)
BLUE RIVER DISTRICT LANE COUNTY**

Local name, Lucky Boy.

Office: 511 Henry Bldg., Portland. D. W. Tilford, Pres.; Cord Sengstake, Sec.-Treas., both of Portland. Amount of capital stock, \$1,000,000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company in June, 1916, sold one-half interest to Seattle and Canadian capitalists.

Property consists of 13 claims, and is located in Sec. 4, T. 16 S., R. 4 E., about 4 miles from Blue River postoffice, on the McKenzie river, which is 45 miles east of Eugene. The wagon road from the mine to the Blue River postoffice is in fairly good condition, and the road from Blue River to Eugene is in good shape. The country is quite rugged and plenty of timber is available.

The district consists of a series of andesitic flows, interbedded with which are beds of andesitic tuffs and breccias. Small intrusions of granodiorite porphyry are found within a radius of a few miles.

The ore deposits are of the fractured zone type, having a general strike of N. 45° to 50° W. and dipping to the southwest. It is probable that the mineralization was caused by rising solutions in fractured zones from the cooling intrusion of the granodiorite porphyry.

At the Lucky Boy mine the country rock is an andesitic breccia. The lode strikes N. 45° W., with a dip of 80° to the northeast. It has been traced for about 5000 feet, and has a maximum width of 45 feet. The oxidized zone extends to a depth of 150 feet. Below this the chief ore minerals are galena, sphalerite and chalcopyrite. The development work consists of 6 drifts and 1 crosscut tunnel. Considerable ground has been stoped. Mill consists of 40 stamps, 5 Wilfley tables and 5 vanners, and the new interests expect to install a flotation plant.

CONTACT MINING AND MILLING COMPANY (copper, gold, silver)
WALLOWA DISTRICT WALLOWA COUNTY

Local name, Contact mine, or Peacock mine.

Office: Lostine, Oregon. H. J. Martin, Pres., Wallowa, Oregon; O. F. Mays, Sec.-Treas. Capital stock, \$1,500,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

Company owns 10 claims and millsite 16 miles south of Lostine, Oregon, on the east side of Lostine creek, in Sec. 30, T. 3 S., R. 44 E., reached by 8 miles of wagon road and 8 miles of trail from Lostine, a station on the O.-W. R. & N. Company's branch line from La Grande. These groups are on a contact between intrusive granodiorite and limestone and limy schist, about one mile from the stream and about one-half mile above it, at an elevation of about 7000 feet.

The limy schist contact with its contact-metamorphic minerals is not the chief point of interest at this property. Development some time ago practically ceased on the contact and was transferred to a nearly vertical pyroxenite dike 5 to 40 feet wide, which diagonally cuts across the limestone in an E.-W. direction. A few hundred feet of the lower end of this dike was observed and as far as one could see the dike continued to the very mountain top.

The dike rock is dark green in color with a texture nearly dense. In thin sections it is seen to consist of about 75 per cent augite pyroxene, about 15 per cent labradorite, 5 per cent biotite, and 5 per cent quartz. The quartz is probably a secondary mineral. Most of the labradorite feldspar crystals are badly altered.

The dike has been somewhat fractured and in the small fissures the pyrite and pyrrhotite have been deposited, together with some chalcopyrite. Some of the contact-metamorphic minerals, garnet and epidote are in evidence near the borders of the dike for the most part, but sometimes are seen in the adjacent limestone. The pyrite and pyrrhotite appear in greater percentages in the outer portions of the dike. This dike, a basic differentiate of the great intrusion injected in a molten condition into the fissure in the limestone, probably had sufficient heat with the assistance of mineralizers to form the small amount of garnet and epidote present.

Practically no mineralization is seen in the limestone adjoining the dike. In an examination of several open cuts scattered for a considerable distance along this dike the copper minerals appear to be too thinly scattered through the dike to be called ore without values in gold and silver.

The above described property was visited in 1914 in the absence of the owners. The description may include claims called the Peacock group, not belonging to the corporation, but to individuals, some of whom are stockholders in the company.

The "Lostine Reporter" of November 9, 1916, reports that the company has given a lease and bond for 5 years for \$65,000 to Ole Twedt, of Seattle, Washington. In their issue of June 8 and July 27, 1916, they state that the "Peacock" group near the "Contact mine" has been bonded to W. M. Montgomery, of Butte, for \$35,000, and was being developed under the direction of J. H. Tonkin and crew.

CONUNDEUM GROUP (gold) CORNUCOPIA DISTRICT BAKER COUNTY

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

COOK MINE (placer) GOLD HILL DISTRICT JACKSON COUNTY

The Cook mine near Draper about 10 miles southwest of Gold Hill is in the S. 1/2 Sec. 13, T. 37 S., R. 4 W. The pay gravel is, in places, plainly stratified, and consists mainly of fine gravel and clay. The stream bed has been mined for one-fourth of a mile. The bed rock is made up of greenstone and slates cut by numerous greenstone dikes. It has been greatly sheared and faulted. One fault runs N. 75° W. and dips 31° N.; another runs N. 53° E. and has been traced nearly one-fourth of a mile.

COOPERATIVE COPPER AND GOLD MINING COMPANY (copper) (Arizona corporation) BAKER COUNTY

Office: 425 Seventh Street, Rockford, Illinois. Alfred Larson, Pres.; J. A. Bowman, Sec.; A. T. Bodin, Treas., all of Rockford, Ill. W. S. Bowers, Baker, Ore., Attorney-in-Fact. Capital stock, \$1,000,000; par value \$1.00; \$500,000 subscribed and issued, and paid up. (1916 report).

The properties of this company are located about four miles northeast of North Powder in Sec. 18, T. 6 S., R. 40 E. The company owns 15 claims, two of which are patented. The shaft and buildings are located upon patented ground.

COOS BAY OIL AND GAS COMPANY COOS COUNTY

Office: Marshfield, Oregon. E. A. Anderson, Pres.; R. T. Kaufman, Sec.; Jno. F. Hall, Treas., all of Marshfield. Capital stock, \$25,000; par value \$1.00; \$13,287 subscribed, \$300 paid up. (1913 report).

Dissolved by proclamation, January, 1917.

COPPER BUTTE GROUP EAGLE CREEK DISTRICT BAKER COUNTY

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

this shattering serves the same purpose since it permitted easy access for the circulating waters to do their work of deposition.

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

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

COPPER EAGLE MINE (copper) GALICE DISTRICT JOSEPHINE COUNTY

The Copper Eagle mine is situated about four miles northwest of Galice on the south side of Pea Vine mountain, and is owned by J. F. Reddy and P. B. Wickham of Grants Pass.

A well defined fissure vein in greenstone 12 to 30 inches wide containing quartz and chalcopyrite is seen in an upper drift for 400 feet along the vein. A tunnel 200 feet long and 120 feet below the drift above mentioned approaches the strike of the vein at an angle of about 25°. A careful survey would determine the change in direction of this lower tunnel to cut the vein in the shortest distance. The vein is said to run 4 to 5 per cent copper and about \$2.00 in gold.

COPPER MOUNTAIN MINING COMPANY (copper) WALDO DIST. JOSEPHINE CO.

Local name: "Continental mine."

Office: Grants Pass, Oregon. C. E. Phillips, Pres.; W. R. Nippers, Sec.-Treas., both of Grants Pass. Capital stock, \$1,000,000; par value \$1.00; \$998,400 subscribed, issued and paid up. (1913 report). Dissolved by proclamation in January, 1917.

The Continental mine, property of the Copper Mountain Mining Company, is located one mile southeast of Takilma in the S. E. $\frac{1}{4}$ of section 35, T. 40 S., R. 8 W. The workings comprise three adits, one with 180 feet of drift following a very slightly mineralized fissure zone. Some distance north of this is another adit with about 100 feet of work. Some ore observed here was chiefly pyrrhotite with some chalcopyrite. West of this working and at about 100 feet lower elevation a cross cut was being driven to intersect the mineralized zone at greater depth. This was 100 feet long when examined. It is said that some good ore has been hauled to Grants Pass from this property.

COPPER KING NO. 1 (copper-gold) ROCK CREEK DISTRICT COOS COUNTY

One-fourth of a mile west of Mr. John R. Smith's placer ground on Rock creek in the south central part of T. 33 S., R. 12 W. is a thick lens of quartz included within serpentine, and which itself encloses small quantities of the latter. It contains considerable chalcopyrite and the upper portion is seamed

with veinlets of malachite and some azurite. A mass of this material measuring about 30 feet long and 20 feet thick is exposed by open cuts. Several prospectors who have examined this deposit consider it a boulder or a large chunk of float which has rolled down from some higher point. There is no doubt, however, that it is in place in the serpentine and represents a "boulder copper deposit" allied to those found farther south in Curry county, but differing notably therefrom in the large quantity of quartz present. This deposit lies about 100 feet east of a big outcrop of dacite-porphry and may be genetically connected therewith. A general sample taken from all the exposures proved to contain 2.23 per cent copper, .05 oz. gold, and .08 oz. silver. Concentration would doubtless produce a fairly high grade ore.

COPPER QUEEN MINE GREENBACK DISTRICT JOESAPHINE COUNTY

The Copper Queen mine is situated in the N. E. $\frac{1}{4}$ of Sec. 15, T. 34 S., R. 6 W. four miles southeast of Leland.

The property is owned by Maloney and Weckler. The ore body has irregular masses of chalcopryrite, pyrrhotite and pyrite between serpentine and greenstone. General occurrence is much the same as ore bodies in the Queen of Bronze and Waldo mines in southwestern Josephine county. Several carloads of copper ore were shipped from this property during the spring and summer of 1916. The property at that time was under lease to P. B. Wickham.

COPPER STAIN (gold-copper) GALICE DISTRICT JOSEPHINE COUNTY

The Copper Stain group is not far from the Gold Bug in the Mount Reuben district. It consists of 7 claims owned by Mrs. S. L. Dana, of Springfield, Illinois. The main adit is caved at the portal but may be entered through stopes reaching the surface. The ore is white quartz with some pyrite, and free gold in a few samples. As at the Gold Bug that part of the ore which is stained by copper minerals is said to be richest in gold. The country rock, at least near the vein, seems to be largely serpentine. There has been no work done here for several years. The equipment (now incomplete) consisted of a Tremaine 2-stamp mill with a crusher, a 3 by 10-foot amalgamating plate and a "cannon-ball" amalgamator. Some work is now being done at the property in preparation to operate again.

COPPEROPOLIS MINE (copper-gold) QUARTZBURG DISTRICT GRANT COUNTY

These claims are located on the west side of the canyon about a mile above the Standard mine on Dixie creek 7 miles north from Prairie City in Sec. 6, T. 12 S., R. 34 E. The development consists of several cuts and tunnels. An 800-foot tunnel from the creek level taps the lode 300 feet below the croppings. The development of this level shows a large irregular chimney-like body of massive quartz containing tourmaline and chalcopryrite. The total copper-bearing width at the surface is about 40 feet. It can be traced for about 1,000 feet. The ore is largely a replacement of the country rock by quartz, tourmaline and chalcopryrite, but in the rock are richer seams of comb quartz and chalcopryrite. The presence of tourmaline indicates magmatic mineralizers and a high formation temperature. Some 250 tons of ore was milled in a small concentrating mill upon the property, which closed down in 1906.

CORBIN PROPERTY (placer) SIXES RIVER DISTRICT CURRY COUNTY

Concerning this property Diller states:

On the right bank of the Sixes about a mile above the mouth of Dry creek (2 miles above the mouth of Edson creek) nearly opposite Mr. N. C. Divelbliss' mine is a placer operated by Mr. W. O. Corbin, who informed the writer that one winter he saved \$11.00 worth of platinum from his washings. He sent 44 ozs. of sand from the mine, which was sieved and washed; it yielded .176 gram of gold, less than one hundredth part as much iridosmine, and no platinum. The relation of the concentrates to the gravel being unknown, the value of the gravel per ton cannot be given.

CORNUCOPIA MINES COMPANY OF NEW YORK (gold)

CORNUCOPIA DISTRICT

BAKER COUNTY

Local name: "Union-Companion."

Office: 60 Wall Street, New York. Jos. B. Thomas, 132 E. Nineteenth Street, New York, Pres.; I. W. Hunter, 60 Wall Street, New York, Sec.-Treas.; Robert M. Betts, Cornucopia, Oregon, Gen. Mgr. Capital stock, \$500,000; par value \$100.00, all subscribed, issued and paid up. (1916 report).

The following is taken from a previous publication of this Bureau:

History.—The gold bearing veins of the Cornucopia district were discovered about 1880. The nearest railroad at that time was the main line at Baker. This distance to railroad transportation, together with the isolation of a snowy mountain camp, caused production to be intermittent for some little time. The strikingly favorable appearance of the veins attracted investors, and early in 1895, although but slightly developed, the Union-Companion claims were sold for \$60,000. The purchasers proceeded vigorously with development and installed a 20-stamp mill and chlorination plant to treat the ore. The latter proved to be unsuitable and was abandoned.

The method followed from this time on was by* "the customary method of crushing with light stamps, amalgamating, and concentrating, with a canvas plant for the tailings. The mill was built in 1896 and succeeded in extracting only about 65 per cent of the values. Owing to the fact that the mine is situated 25 miles from a railroad, the hauling, together with smelting charges on the concentrates, combined with the low extraction, made it very difficult to keep the property on a paying basis. It was therefore decided that, if possible, the ore should be treated by cyanidation, thus eliminating outside charges on concentrates and at the same time making a better recovery of the metals contained in the ore. Tests showed that a satisfactory extraction could be obtained by grinding fine, and treating the product by agitation and filtration. Accordingly, in June, 1912, construction on the cyanide plant was started. The crusher, ore bins and stamps of the old mill were left intact, and only such changes were made to the mill buildings as were necessary to accommodate the new machinery." Since the completion of this plant, March 1, 1913, the production has been steady and profitable.

Geology.—The outcrop of the Union-Companion vein is at an altitude of 6100 feet, or 1400 feet above the town of Cornucopia, one and one-half miles away down Fall creek. The outcrop of this vein is traceable, according to Bernard McDonald, for 6800 feet throughout the lengths of the Union, Companion, Red Jacket, and Robert Emmett claims. Its strike is about N. 20° E. and dip 45° W. into the mountain; its maximum width is 20 feet.

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

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

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

*Paul W. Gaebelein in the Engineering and Mining Journal of February 28, 1914.

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

The Vein.—The width ordinarily is 2 to 5 feet but it swells in places to a maximum of 20 feet.

"On the whole the vein is remarkably persistent. Hanging and footwalls are sharply marked, inclosing a massive vein of white normal quartz. A ribbon structure by shearing is usually developed in the lower parts of the vein, or at least for a few inches from the footwall."

"The Union-Companion-Red Jacket vein has been developed, at one place in the Union claim, to a maximum depth of 800 feet, while in its northerly extension through the Union, Companion and Red Jacket claims, it has been developed to variable depths averaging 300 feet. This development has revealed the existence of four ore shoots having an average width of three feet and an aggregate length of 1,200 feet along the vein."

"The ore is a hard quartz, containing 3 to 5 per cent pyrite carrying the gold. Silver is present partly as a sulphide, and the proportions of gold to silver by weight are approximately 1-5. There are also present in the ore appreciable quantities of chalcopyrite, arsenopyrite and blende. The ores are variable in value, ranging from \$10 to \$20 for mill-run grade."

The principal shoot on the Union claim is now down to the 500 level, 100 feet lower than in 1903. The drifting on this level revealed a shoot of ore whose length, width, and grade compare favorably with those above. Of course a vein in which the gold is locked up in sulphides not usually disseminated, but rather in bunches within the massive quartz, must of necessity vary from place to place. Nevertheless when considered in a larger way the precious metal content is quite regular in the stopes from the different levels. Sinking on the vein has been started from the 500-foot level since the camp was visited.

This vein probably represents the final activity of the granodiorite. It would appear from the excess of sulphides on the borders of "greenstone" fragments in the vein that these ferro-magnesian silicate rocks assisted, at least locally, the other agencies in the precipitation or deposition of the metals in the vein. How much of practical value this might prove to be in determining the advisability of developing veins where they cut granodiorite only, would require considerable field examinations, geologic mine mapping and assay maps to determine even if it is determinable.

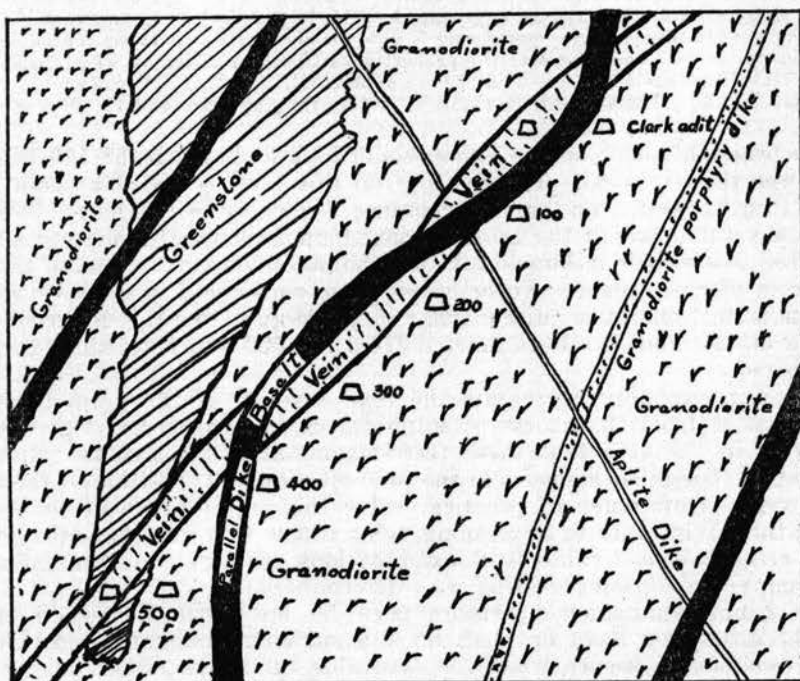
The Union-Companion operators need be but little concerned on this point because they have on each level a sufficient amount of granodiorite and greenstone to secure whatever favorable influences either one of these wallrocks might provide. The lowest developed level, the 500, has perhaps a greater proportion of greenstone wallrocks than the others, although "granite" is abundant; so that the ore developed for the next lift or two at least should be unaffected by this suggested influence.

Future of the Mine.—It seems reasonable that since the ore has continued for 1000 feet in depth without appreciable diminution in value, it may be expected to continue to a much greater depth. It might even be expected, if the greenstone wallrocks had an appreciable effect in the precipitation of sulphides and, therefore, in the location of at least the richer parts of the ore shoots, that new development below the present lowest level might reveal even better ore there, because of the great amount of greenstone found at depth.

The unbroken continuation of one and the same shoot is not necessarily to be expected. Barren levels occasionally interrupt rich and extensive shoots in any district.

A matter of considerable importance in developing ore bodies in this camp is the large number of basalt dikes found in close proximity to the veins. These dikes are found with strikes in all directions. Whatever the forces

were which created these deep-seated fractures now filled with the once molten rock, they must have been very great to overcome the rock's tremendous resistance to rupture. Nature, like armies on the offensive, seeks out the lines of least resistance, so that fracturing will always follow, as much as may be, old breaks or lines of weakness. When the rocks or crust of the earth is being broken at or nearly at right angles (greater than 45°) to a then existing line of weakness, such as a quartz vein, it will break directly across it. This is seen to have occurred in the Union-Companion vein and is shown on the map as the "Cross dike." But should the break approach at less than 45° to the old line of weakness it will turn and break into it, will follow as far as it can the easiest way, to finally break through the other wall and continue on its general course.



Ideal cross-section of Union-Companion vein, country rock and dikes

The latter condition is well shown in the "Parallel" dike on the working plan and in the ideal cross section.

The "Cross dike" passes through the quartz vein and, therefore, was made since the completion of the vein. It can, then, have had no effect upon the vein, except a mechanical one, that is, to cut it in two where it crosses.

In the case of the "Cross dike," no question would arise in the minds of prospectors or operators as to which came first, the vein or the dike. The vein was plainly completed before this crosscutting dike came to cut the vein in two.

Although the "Parallel" dike undoubtedly came since the entire filling of the quartz vein was completed, and at the same time as the "Cross dike," it is less easy to believe that it did succeed the quartz vein. This confusion arises quite naturally:

1. Because this dike is found in the plane of the vein over a large area of its walls.
2. Because the vein is found on both sides of the dike, although ore is but

rarely found locally on both sides except at the outer limits of some of the stopes.

3. Because in the Last Chance vein ore is found on both sides of an aplite dike undoubtedly older than the vein.

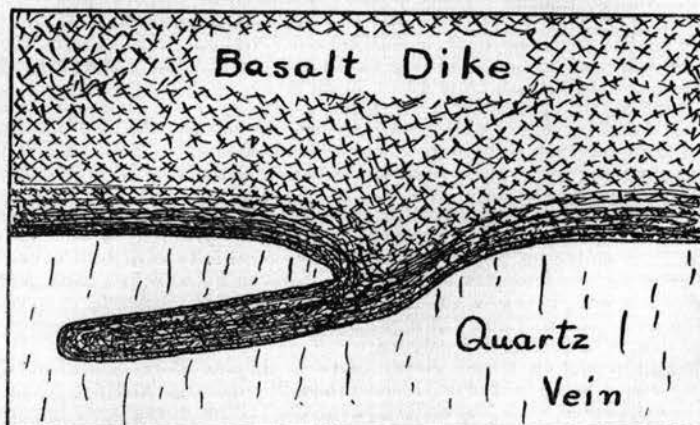
The plane of the vein has a dip into the hill of approximately 45 degrees. The forces which fractured the earth at this point to let in the basalt were applied in such a way that it broke at a steeper angle than the vein fissure previously formed. Approaching the plane of the vein at a rather acute angle, it then had every reason to take advantage of the plane of weakness of the quartz vein to break into and remain in it over a large area.

The dike fracture broke into the vein through the latter's hanging wall above the Clark level and remained in the vein to a point between the third and fourth levels, where it broke through the footwall to continue its natural and steeper dip, so that on the 500-foot level it is some 80 feet away from the vein.

It should cause no surprise that in the fissuring anew in the plane of the quartz vein the break should follow in places the hanging wall, in others the footwall of the vein, breaking diagonally across from one wall to another, and occasionally splitting the quartz vein for considerable areas. The intrusion of the basalt into this fracture left large lenses of ore on both sides of the basalt dike in such forms that the most natural conclusion to be arrived at is that the vein was formed since the dike was formed, that the dike had considerable to do with the vein and its values, and that exploration should follow closely the walls of the dike. Because of this conclusion previous managements followed the dike rather than the vein on its downward course, and for a long time crosscutting in the hanging wall of the dike was not prosecuted. In various parts of the mine evidence is seen of much wasted money spent in the search for ore because of this erroneous theory.

Because of the habit in this camp of following dikes in the search for ore, rather than making the search independently of dikes and on the general course of the vein, it seemed advisable to make the foregoing lengthy statement and to prove its correctness by field study in the following manner:

Intrusions of molten rock naturally solidify quickly next to their cool walls. This chilling comes so quickly that close to the walls it is almost like glass, very dense and fine grained. Here it remains fluid for so little time that crystals have little time to form. As one goes farther toward the middle the cooling is more and more delayed and larger and larger crystals



Tongue of Basalt injected into quartz vein

have time to form, so that in a thick dike, while its borders are almost glassy, its interior contains crystals of considerable size.

1. Search was made along the walls of the dike in contact with the vein to find a branching of either one into the other. When this was found, as illustrated in the sketch, the "glassy" borders of the tongue of basalt into the quartz, together with the "glassy" condition of the main wall of basalt nearby, proved that the basalt was intruded into the quartz; that the tongue of the basalt was not a "horse" in the vein and therefore older. This in itself is sufficient proof that the vein is the older.

2. Contacts of the dike with the vein were investigated at various points and it was found that these contacts are invariably chilled contacts and do not show the alteration due to the action of hot circulating waters, evident in all the other wall rocks of the vein. This new or fresh condition of the basalt adjoining the vein is sufficient proof in itself that the vein was formed first.

3. On the Clark level of the Union-Companion mine, it was noted that the "Cross dike," plainly and admittedly of later age than the vein, merged into the "Parallel" dike at their junction in such a way as to prove that they were intruded into these fractures and solidified at the same time. Besides the evidence of the eye at this junction of the two dikes, the microscope revealed in thin sections taken from each dike that they had identically the same mineral composition. This is in itself a sufficient proof that the "Parallel" dike came since the vein was formed.

It is quite evident that both prospector and mine superintendent can make practical use of the conclusion that the basalt or "iron" dikes came since the veins were formed. They should look upon the "iron" dike as a mechanical interruption of the continuance of the vein, which must be broken through or passed over to find the vein beyond. If a dike follows a vein for some distance, when it does leave the vein, rather than worry for fear the values will cease in its absence, they should give thanks.

Cyanide Plant of the Cornucopia Mines Company.—The following excellent description of the crushing and cyaniding methods practiced at the Union-Companion mill is from the pen of their mill superintendent, Paul W. Gaebel, in an article in the Engineering and Mining Journal of Feb. 28, 1913:

Methods of Crushing and Grinding.—The ore is received directly from the mine cars on three grizzlies set to 1½ in. The undersize falls directly into the ore bin, which has a capacity of 150 tons, and the oversize passes to a 9x15 in. Blake crusher, reducing the ore to 1½-in. size and delivering to the ore bin. The rock is then fed by challenge feeders to 20 950-lb. stamps which make 98 drops per minute through 7-in. Approximately 6 tons of a 0.125% solution of sodium cyanide per ton of ore are fed to the mortars, and the ore is crushed through No. 930 ton-cap screens, which correspond to about 8 mesh. Lime is added at the feeders in sufficient quantity to give the solution a protective alkalinity of 0.7 to 0.8 lb. CaO per ton. The stamp duty is 5.15 tons per stamp. Chrome-steel shoes and cast dies are used, which combination is giving excellent results. The shoes last from 80 to 90 days, while the dies usually last from 40 to 50 days.

At the beginning of operations amalgamation was given a thorough trial extending over a period of several weeks. With finer screens, the results obtained did not justify its continuation, due to the fact that there is but a small amount of free gold in the ore, and that the coarse crushing in cyanide solution made conditions unfavorable to good work. It was therefore discontinued.

The battery product is equally divided between two 4-ft. Callow cones, which remove the coarse sand and feed it direct to the tube mills. Fine grinding is accomplished in two 5x22-ft. tube mills mounted on tires. The advantage of this type of mill over the trunnion type is its lower power consumption. Each mill is driven by a 50-hp., back-gear, General Electric induction motor, which is connected to the tube-mill drive by a spring coupling. The mills make 26 r.p.m. and are lined with 4-in. siliceous blocks. This lining lasts seven months. Local quartzite is used for pebbles.

Each tube-mill works in closed circuit with a simplex Dorr classifier, the overflow from the Callow cones being joined with the tube-mill discharge and fed to the classifiers. The sand discharge, joined with the underflow of the Callow cones, runs by gravity to the tube-mills, which are equipped with scoops 6 feet in diameter. The only product leaving the crushing and grinding department is the slime overflow of the classifiers.

Each tube-mill is fed with 50 tons per day of material, which has the following screen analysis:

	per cent		per cent
-10 mesh.....	95.9	- 60 mesh.....	36.5
-20 mesh.....	74.2	-100 mesh.....	26.7
-30 mesh.....	60.8	-150 mesh.....	22.9
-40 mesh.....	50.4	-200 mesh.....	20.9

This material is first fed to the classifier, which removes the product finer than 200 mesh, returning the remainder to the tube-mill for regrinding. The finished product has the following average analysis:

-100 mesh, 98%	-150 mesh, 94%	-200 mesh, 86%
----------------	----------------	----------------

As mentioned above, the ore is hard quartz and difficult to grind, and even when ground so that 86% passes 200 mesh, it is still fine sand, and contains practically no colloidal matter or true slime.

Continuous Cyanide Treatment.—The entire product from the crushing and grinding department flows by gravity to a 30x10-ft. Dorr thickener, where it is thickened from a ratio of 6:1 to 2:1 for agitation. The solution overflowing this thickener is used for dilution, as will be described later. The thickened underflow is transferred by a 3-in. air-lift to the agitation tanks.

The three agitators are of the standard Pachuca type, 12 feet in diameter and 36 feet deep. They are operated in series, the pulp receiving about 36 hr. agitation in passing through the three tanks. The solution is brought up to the standard strength of 3 lbs. per ton as it enters the agitation series. Continuous agitation has proven to be efficient and economical in operation, and the Pachuca tank gives satisfaction. Notwithstanding the sandy nature of the pulp and its quick-settling properties, the agitators keep the pulp of a uniform grade throughout the series, and after a year's continuous operation have disclosed no objectionable features. Compressed air at 30 pounds pressure is used, and when necessary, as after a shut-down, high-pressure air from the mine compressors can be furnished for starting.

Tests and experiments on the mill solutions have shown that approximately 35% of the total dissolution of the gold and silver takes place in the mill, while the remaining 65% is dissolved in the agitators. The solution carrying the pulp from the last agitator of the series is consequently relatively high in value. The solution overflowing the 30-ft. thickener is also the lowest grade of the mill solutions. Owing to the fact that the filter plant consists of continuous, revolving drum filters, which are not adapted to the filtration of pulp which is carried in a high-grade solution, it is necessary to reduce, by dilution, the value of the solution which leaves the last agitator with the pulp.

This dilution is accomplished in two 20x10-ft. Dorr thickeners, and the diluting solution is the solution overflowing the 30-ft. thickener. The two 20-ft. thickeners are run in series, and the solution overflowing the 30-ft. thickener, runs into a collecting box from which it is pumped by a 2-in. centrifugal pump and equally divided between the two thickeners. The pulp leaving the last agitator overflows into a 3-in. air-lift which transfers it to the first of the two thickeners. On entering, it is mixed with the diluting solution, which brings the dilution up to approximately 4:1. It is thickened in this tank to 1½:1, and the thickened underflow is transferred by a 3-in. air-lift to the second thickener. The solution overflowing the first thickener is collected in a box, and flows by gravity to the precipitation plant. The pulp entering the second thickener is mixed with diluting solution and thickened to 1 to 1 for filtration, while the solution overflowing is returned to the battery for use in crushing. This dilution reduces the value of the solution, leaving the second thickener to one-third of its original value, which is low enough for filtration. The pulp from the second thickener is carried by a 3-in. air-lift to the filter plant.

The filter plant is composed of two continuous, revolving drum filters. The drums are 14 feet in diameter and 9 feet face. In common with most vacuum filters, their capacity varies with the character of the pulp filtered, and on this sandy material the capacity is great. The entire product of 20 stamps can be handled easily on one machine, and as much as 115 tons have been filtered in 24 hours. The cake is ½ inch thick, and is washed by a series of sprays, which are intended to keep the cake moist on its way to the scraper. The level of the pulp in the tank is kept as low as possible, and the cake receives a thorough air-drying before emerging from the tank. By the combined air-drying and spray-washing, the dissolved loss is kept to a reasonable figure.

A 12x14-in. Buffalo wet vacuum pump furnishes the vacuum for the filters, and discharges the filtered solution into a small collecting tank. The tailings from the filter are removed by the scraper and deposited on a belt conveyor which stacks it on the dump. The great advantage of these filters is in their low maintenance and repair cost, and in the fact that they do not require the services of a special filterman.

Clarifying and Precipitation.—The solution to be precipitated comes from two sources; the solution overflowing the first of the 20-ft. thickeners, and the filtered solution. These solutions flow into a small collecting tank, from which they are pumped by a 3-in. centrifugal pump through a 36-in., 18-frame Merrill clarifying filter. The effluent from the press

flows by gravity to four pregnant-solution sumps, each 14 feet in diameter and 6 feet in height. The Merrill system of zinc-dust precipitation is used. The zinc-dust is fed by a screw feeder into an emulsifier, and the resulting emulsion of zinc-dust is fed to the suction line of a 4½x6-in. Buffalo triplex pump. There are in use two 36-in., 18-frame Merrill zinc-dust presses. The triplex pump works against a head of approximately 85 feet when filling the presses. The barren or precipitated solution leaving the presses flows by gravity to the main storage tank, 26 feet in diameter and 6 feet in depth, which is situated in a separate building, and which supplies the small battery feed tanks.

Precipitation results have been satisfactory in spite of the fact that there is considerable copper dissolved from the ore, the precipitate often running 35% copper. The clean-up is made from 3 to 4 times a month. The precipitate is dried in a muffle furnace and melted direct in a No. 125 Donaldson tilting furnace using fuel oil. The resulting bullion varies considerably in grade, depending on the amount of copper in the precipitate, but it usually averages 750 fine in gold and silver.

The extraction obtained is 90% of the gold and from 70% to 80% of the silver, making a total of 87.5% to 89% of the value contained in the ore. Each ton of ore treated consumes 1.40 lbs cyanide, 3 lbs. of lime, 0.90 lb. of zinc-dust. These vary considerably with the different grades of ore, and the figures given above are an average of the consumption over a period of several months' operation, during which period the value of the ore varied from \$10 to \$16 per ton.

In designing the plant, it was endeavored to make as many of the operations as possible, continuous. The object has been attained in that, since the beginning of operations, the plant has been run by two men on a shift, exclusive of the crusherman. Crushing is done on two shifts only. The batteryman has charge of the stamps and the tube-mills. He attends to all the work incident to the operation of this portion of the plant, and is assisted only in the larger battery repairs. The solution man operates the remainder of the plant. There is no steady attendant in the precipitation room. Melting is done by the assayer, with his assistant. On the day shift there is a repair man with one helper, who keeps up all the necessary repairs.

The plant requires 230 hp. when operating at full capacity. Power is furnished by the company's hydro-electric plant, situated about two miles from the mine. Current is transmitted at 6,600 volts and transformed to 2,200 volts at the mines for use in the motors. The cost of treatment averages \$2 per ton, and is subdivided as follows:

	per ton
Labor	\$0.65
Supplies	1.03
Power	0.12
Marketing product	0.20
Total	\$2.00

Owing to the distance from the railroad, a 25-mile haul, most of which is a rather heavy grade, the freight charges on all supplies are high. The property has been under the management of Robert M. Betts, since the present owners acquired possession, and the mill was designed by Walter L. Reid, of Telluride, Colorado.

Since the above was written in 1914 the property has been producing steadily, although the extremely dry season of 1915 reduced the horsepower available in the company's hydro-electric power plant, located on Pine creek, about one and one-half miles below Cornucopia. Another hydro-electric plant located in Cornucopia was completed in June, 1916. This plant is capable of delivering 300 additional horsepower which, added to the old plant, furnishes ample power for all purposes at mine and mill. Previous to the completion of this additional generating station the lack of power prevented running the mill more than half capacity much of the time for the previous year. In the mine a large triplex pump has also been installed on the sixth level to replace smaller units, which were scarcely able to handle the water during the wet season. A raise connecting the fifth level with the Clark or mill level has been run. This raise was made directly above a winze, which was sunk to develop the sixth level and below. It has been timbered and equipped and is now in use as the main working inclined shaft.

The development of the sixth level in 1915 opened up the shoot on that level, which in width, length and value compared quite favorably with that on the upper levels. Since the new shaft and pump have been in operation, sinking has been continued below the sixth and development begun on the seventh. The results of this development below have not been announced.

The property is now equipped for steady and full operation and in all probability will maintain profitable operation for some years to come.

CORPORAL G MINE (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Corporal G. mine, 5 miles north of Gold Hill, is in the southern part of Sec. 19, T. 35 S., R. 3 W., at an elevation of about 2600 feet above sea level. It is said to have been discovered in 1904 by J. R. McKay, who took out some ore and sold it to Mrs. N. M. Smith, of Gold Hill. It was operated under lease by J. E. Kirk in 1907. It is opened by three adits on the main vein, one above another, on the hillside, and one adit to one side. The adits are about 100 feet long and the vein has been stoped out above the upper adits; the lowest adit was not open to inspection. The vein has a width of 3 to 12 inches and strikes S. 85° W., with a dip of 60° N. The country rock is a micaceous slaty quartzite cut by andesite and spessartite. The ore contains quartz, calcite, pyrite, pyrrhotite and a little chalcopyrite, bornite, sphalerite, galena, and rare free gold. The adit to one side of the main vein opens a parallel stringer on the Volunteer claim; it pinched out at 135 feet.

COSTER AND CATTON'S CLAIM (gold) GOLD HILL DISTRICT JACKSON COUNTY

Coster and Catton's claim, 12 miles southwest of Gold Hill, is in the S. W. ¼ Sec. 21, T. 37 S., R. 4 W., on the right fork of Foots creek, at an elevation of 2550 feet by barometer. A 1 to 2-foot quartz vein here strikes N. 85° E. and dips 70° N. in greenstone. One stamp has been erected in the gulch to be operated by an overshot water wheel, but water is insufficient in summer time. The vein is opened by shallow workings for about 25 feet. About a mile to the northeast near the N. ¼ corner Sec. 22 an intrusion of aplite is visible for 200 feet along the ditch line running around the point.

**COUGAR GOLD MINING AND MILLING CO. (gold) (Washington corporation)
GRANITE DISTRICT GRANT COUNTY**

Local name, Cougar mine.

Office: 113 Stevens St., Spokane, Wash. David R. Adams, Pres., 1624 Mallon Ave., Spokane; N. Johnson, Sec.-Treas., 113 Stevens St., Spokane; J. W. Larkin, managing agent, 2419 Boone Ave., Spokane. Capital stock, \$2,000,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

About 3 miles north of Granite, a half mile west of the creek, is the Cougar mine, at an elevation of 5200 to 5400 feet. It was discovered in the '90s. The development extends over a vertical distance of 300 feet and consists of short crosscuts to the vein and over 2000 feet of drifting on three levels.

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° S. E. 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 stoping 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 sulphides 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.

About April, 1916, this mine was taken over under lease and bond by the United Gold Mining Company, of Spokane, which is described in another place.

COUGAR PROSPECT (gold) QUARTZBURG DISTRICT GRANT COUNTY

This gold prospect is located in Sec. 2, T. 12 S., R. 33 E., on the east side of the west branch of Dixie creek. It is a fissure vein with widths up to 3 feet, and reported to have values in gold and silver up to \$450 per ton. George and William Ward, the owners, expected to have a Bryan roller mill installed and driven by water power sometime in November, 1916.

COUNTY LINE MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

For description see "Mount Pitt Mine."

COWBOY MINE (copper) WALDO DISTRICT JOSEPHINE COUNTY

The Cowboy mine is located in the N. E. $\frac{1}{4}$ of Sec. 11, T. 41 S., R. 8 W., about 3 miles southeast of Takilma. It is controlled by the Tutt estate, Colorado Springs, Colorado. At present it is under option to John Hampshire, of Grants Pass, and the Twohy Brothers, of Portland. This mine is similar to the Queen of Bronze in the character of its ores, their modes of occurrence and associations, which see for description.

COX (C. C.) CLAIM (copper) EAGLE CREEK DISTRICT BAKER COUNTY

C. C. Cox, of Baker, has 2 groups of claims in this region. One group is located about 3 miles south of Sanger on Goose creek, and the other 3 miles still farther south on Sawmill gulch, a tributary of Goose creek. The country rock in both places is a dense greenstone. At the upper claims there are small lenticular veins which contain chalcopryrite. At the lower claims the country rock is cut by small veins of quartz and pyrite. They also contain some epidote and chalcopryrite.

There has been in previous years a great deal of activity in this greenstone area in prospecting for copper.

Development progressed slowly in 1915 and in August, 1916, a reported strike of copper-bearing rock about 30 feet wide was made, and in September it was reported in the press that these claims had been bonded to Spokane parties.

CRACKERJACK CLAIM (copper) ASHLAND DISTRICT JACKSON COUNTY

The Crackerjack claim is about 3 miles southwest from Ashland and about 600 feet southeast of the Pilgrim. It is opened by a crosscut at an elevation of about 3000 feet and by an incline shaft about 75 feet higher up. The vein strikes N. 10° W. and dips 55° S. W. The country rock is a metamorphosed sandy shale, now containing layers of quartz separated by layers of zoisite and some pale green hornblende, with some disseminated calcite and a few isolated crystals of chalcopryrite, films of bornite and rare pyrite.

CRACKER-OREGON MINE (gold) CRACKER CREEK DISTRICT BAKER COUNTY

A vein paralleling the North Pole-Columbia lode, about 1800 feet south-east of it. The principal workings are located in the north end of the town of Bourne.

There is considerable development on a lode of a type similar to the others in the argillites of Cracker creek. It has a 10-stamp mill, with plates and 4 vanners for concentrating, but the property has produced but little and has been idle for some years. One of F. Wallace White's "promotions" and "consolidations."

CRAMER PROSPECT GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Cramer prospect, 4 miles east of Merlin, is on Walker mountain, in Sec. 18, T. 35 S., R. 5 W., at an elevation of about 2350 feet above sea level. It is opened by an adit in greenstone, which extends N. 55° E. 60 paces to a shaft to the surface. There are other minor workings. The main fissure vein strikes N. 55° E. and dips 40° N. W. There is only a little vein material disclosed, and there has been no work done for several years.

CRATER GOLD AND COPPER MINING COMPANY BOHEMIA DIST. LANE COUNTY

Office: Portland, Oregon. Chas. Destel, Pres.-Treas., 180 Burnside St., Portland, Oregon. Capital stock, \$1,000,000 (nominal); par value \$1.00; amount of capital stock subscribed, none; \$689,000 issued and paid up. (1916 report).

Property consists of 12 claims, located in Sec. 15, T. 23 S., R. 1 E., about 1½ miles southwest of Bohemia postoffice, which is about 15 miles southeast of Disston, the terminus of a 20-mile branch railroad from Cottage Grove.

Development work consists of 101 feet of tunnel, open cuts and 1200 feet of trail work. Assessment work only being done.

CRAWFORD AND FAY CLAIMS (placer) SIXES RIVER DISTRICT CURRY COUNTY

Mr. and Mrs. S. B. Crawford and Emmet Fay are the owners of 4 placer claims on South fork of Sixes river, which they were developing at the time of this investigation. These are the Old High Channel, located in June, 1915, the Dixey, purchased for \$500, and the Dixey Extension Nos. 1 and 2, which were located during July, 1915. The first named is an old high river bar, but all the work was being done on the other claims and was confined to sluicing along the creek bed. The owners said they had taken out \$20 worth of gold in 3 days' mining, and that most of the values were found directly on the bedrock.

CROWN MINING AND MILLING COMPANY (gold and silver) NORTH SANTIAM DISTRICT MARION COUNTY

Local name, The Crown mine.

Office: Scio, Oregon. Clarence Ingram, Pres.; R. M. Peery, Sec.-Treas., both of Crabtree, Oregon. Capital stock, \$100,000; par value \$1.00; \$62,511.50 subscribed, issued and paid up. (1916 report).

This company owns 7 claims about 12 miles by wagon road northeast of Gates on the Little North fork of the Santiam river, on the north side of Elkhorn mountain in Secs. 32 and 33, T. 8 S., R. 4. E., at an elevation of about 3000 feet.

The principal country rock in this vicinity is andesite, which is widely distributed over the Cascade Range. On this property the andesite has been intruded by a granitic rock, which is a fine grained granodiorite. The outcrop of this granodiorite was only observed at a few points two to three hundred feet southwest from the vein, where the usual aplite dikes were seen to accompany the intrusion.

Fracturing of the andesite and the movement of one block upon another produced the sheared or brecciated zones. In these zones the mineralization has taken place because of the more favorable opportunity for deposition by circulating hot waters. Gold and silver were deposited in these brecciated zones, together with pyrite, chalcopyrite, sphalerite, and a small amount of

galenite. Quartz is associated with these sulphides, which was deposited at the same time.

The mineralized brecciated zone on the Crown property is 10 to 12 feet wide, as exposed in a cut some 25 to 30 feet long and 20 feet deep. The company at present is driving a tunnel below this cut, which will, according to plans, cut the vein about 50 feet below the open cut above referred to. The company has also driven a 90-foot development tunnel on another claim about 2000 feet west of the above workings, but only a few small stringers of quartz and sulphides have thus far been exposed, the vein for which it is being driven not having been reached.

CURRY MINING COMPANY (copper) COLLIER CREEK DISTRICT CURRY COUNTY

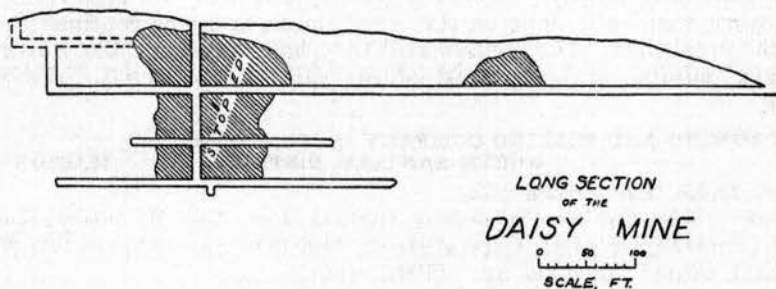
Local name, Bonanza King.

Office: Bandon, Oregon. I. W. W. Crumrine, 410 N. 10th St., Independence, Kan., Pres.-Treas.; John A. Wolf, 906 N. Penn Ave., Independence, Kan., Sec. Capital stock, \$1,000,000; par value \$1.00; \$500,001 subscribed, issued and paid up. (1916 report).

This company owns the Bonanza King copper mine, located about $3\frac{1}{2}$ miles above the mouth of Collier creek, in Curry county. This is probably the same property as that described under the title, "Bonanza King."

DAISY MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Daisy mine, 10 miles east of Hugo, was known at one time as the Hammersley mine, and is still frequently so called. It is just east of the divide between Jack creek and Bummer gulch, at the head of the latter, at an elevation of 3800 feet, as measured by barometer. It is owned by G. R. Smith, of Grants Pass. It was discovered in 1890 and has produced more than \$200,000 in gold, according to the owner. It is equipped with a 5-stamp mill, having a 14-foot amalgamating plate and one concentrating table, as well as steam boiler and engine. The workings are shown in the illustration, which



Longitudinal section of Daisy mine

is a section in the plane of the vein based on a similar drawing made by A. H. Gunnell, of Grants Pass, in 1908. A long crosscut adit is now being driven to reach the ore body at considerably greater depth. The vein strikes nearly east and west in andesitic country rock. The main shaft follows the vein on a steep incline. The ore consists of vein quartz, with some calcite and brecciated fragments of argillite, serpentine and quartz cemented by epidote, quartz, calcite and kaolin.

DAISY MINING COMPANY (gold-copper) WALDO DISTRICT JOSEPHINE COUNTY

The property of the Daisy Mining Company is located $\frac{1}{2}$ mile southwest of Takilma. It has 2 adits in the N. E. $\frac{1}{4}$ of Sec. 34, T. 40 S., R. 8 W. A large fault crosses the lower adit, striking N. 10° W. and dipping 75° to the west. The upper adit is about 45 feet above the lower. The ore observed here is

chiefly pyrite with pyrolusite, hematite and serpentine, and traces of bornite and malachite. It is said to carry gold and chalcopyrite in valuable amounts.

DALE PROSPECT (gold)**BAKER DISTRICT****BAKER COUNTY**

Near the center of the west half of Sec. 22, T. 9 S., R. 39 E., west of Washington gulch, more than 400 feet of tunneling has been done along a vein which strikes N. 23° E. and dips 70° W. The vein carries both quartz and calcite, the latter being of very fine grain and possibly of the nature of aragonite rather than calcite. The footwall is distinct and the hanging wall is less so. In one of the branch tunnels there is a very pronounced fault zone striking N. 67° W., and dipping 65° toward the north. About 100 yards south-east of this locality are old openings in much decayed rock, which shows masses of gossan. The largest of these which was seen was about 5 feet in horizontal diameter and 6 feet deep. A little unaltered pyrite was observed in this gossan, which is mainly limonite with small quantities of hematite.

DAN O'SHEA CLAIM**CANYON DISTRICT****GRANT COUNTY**

Described under "Great Northern Mine," since it is owned by same company.

DEEP GRAVEL MINING COMPANY (placer) WALDO DIST. JOSEPHINE COUNTY

Local name, Deep Gravel mine.

Office: Medford, Oregon. W. J. Wimer, Waldo, Oregon, Pres.; A. E. Reams, Medford, Sec.-Treas. Capital stock, \$85,000; par value \$100; \$75,100 subscribed, issued and paid up. (1914 report).

This mine is located 1 mile northwest of Waldo. It embraces about 560 acres in Secs. 20, 22 and 28 of T. 40 S., R. 8 W., the chief workings being in Butcher gulch and its tributaries, about a mile northwest of Waldo. According to Kay:

The gravels of these gulches are included in a bench which extends from the head of the Butcher gulch to the west fork of the Illinois river. The upper limit of the bench is about 1½ miles from the west fork and about 125 feet higher than the bed of this stream. The most recent workings are in Joe Smith gulch, where an area of more than 10 acres has been mined. At the upper end of these workings the gravels are about 12 feet in thickness; at the lower end they are more than 60 feet, and the bank consists of gravel and sand containing practically no boulders except small ones in the lowest 10 feet. Stratification is well shown. The bed rocks in Joe Smith gulch consist of purplish conglomerates of Cretaceous age, similar to the conglomerates that are being mined in the High Gravel mine.

The pay gravel is washed through a sluice, elevated by hydraulic pressure, and carried through another long sluice, with steel lined riffles.

A clean-up is made about once a month. The gold is saved by amalgamation and is very fine. The concentrates are sold for their values in platinum, osmium, and iridium. Mr. Wimer stated that the average value of the pay gravels during the years 1903-1907 was about 25 cents to the cubic yard. The water used in the pit and in the elevator is brought by 2 ditches from the east fork of Illinois river. The longer of the 2 ditches is about 4 miles in length.

According to Mr. Wimer, about \$130,000 had been expended on the property and about \$250,000 taken out of it before 1908. It embraced about 560 acres in Secs. 20, 22 and 28 of T. 40 S., R. 8 W.

DeLUSE MINING AND DREDGING COMPANY (placer)**GOLD HILL DISTRICT****JACKSON COUNTY**

Office: Sutherlin, Oregon. J. F. Luse, Pres.; H. M. MacLean, Sec., both of Sutherlin; A. E. Bamber, Treas., Gold Hill. Capital stock, \$10,000; \$6900 capital stock paid up. Four persons own the stock. (1914 report).

This company owns 240 acres of placer ground in Sec. 11, T. 36 S., R. 3 W.

DEVILS GATE MINING COMPANY**CALIFORNIA**

Office: 979 E. 24th St., Portland, Oregon. G. A. Keller, Decatur, Ill., Pres.; Otis E. Wise, 979 E. 24th St., Portland, Sec.-Treas. Capital stock,

\$25,000; par value \$1.00; \$11,933 subscribed, issued and paid up. (1916 report).
This company's properties are located on American river in California.

DIADEM MINE (gold and mercury) GREENHORN DISTRICT BAKER COUNTY

The Diadem is but a short distance from the Banzette and about 1½ 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 workings was visited.

DICK MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Dick mine is 8 miles east of Hugo, in the N. E. ¼ Sec. 8, T. 35 S., R. 5 W., on the northeast side of Walker mountain, at an elevation of about 2400 feet, as measured by barometer. It belongs to Fetch and Long. An adit has been driven about 200 feet in a westerly direction in quartzite. Gold ore taken out has been run down the hill in a flume to an arrastre.

DIXIE CREEK PLACERS QUARTZBURG DISTRICT GRANT COUNTY

These placers extend from Prairie City north and up Dixie creek for a distance of 4 miles, as well as below the town, in the John Day valley, and cover several hundred acres. Most of the ground was worked in the early placer days and locally the gross production is stated from \$600,000 to several millions. The gravel is from 10 to 15 feet deep and the width of the gravel-covered creek bottom is from 300 to 800 feet. In the summers of 1915 and 1916 prospecting was done by means of pits and churn drilling to determine whether it would be advisable to install a dredge upon this ground, but the result of this prospecting has not been announced.

DIXIE MEADOWS MINE (gold) QUARTZBURG DISTRICT GRANT COUNTY

The Dixie Meadows mine is located on the headwaters of Ruby creek in Sec. 23, T. 11 S., R. 33 E., and is owned by L. Vogelstein & Co., of New York. This mine has been quite extensively developed and has a small mill upon the ground. The vein is a large one, much of it decomposed country rock containing considerable gold-bearing pyrite and arsenopyrite.

The ore body, although a large one, is quite spotted and its soft condition makes difficult the extraction of the higher grade bunches. These higher grade bunches are much less in evidence in the lower levels. There is difficulty in concentrating this ore, at least with the present equipment, so as to have a margin above transportation and treatment charges. If the entire body of ore could be treated cheaply upon the ground perhaps this property could be successfully worked. Leasers during the winter of 1913-14 extracted and milled some of the higher grade ore, but ceased operations about the middle of the year. Since then much of the workings have caved and it will take considerable work to reopen the mine.

DIXIE QUEEN MINE (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Dixie Queen mine, 8 miles southwest of Gold Hill, is on the left fork of Footh creek in the N. W. ¼ Sec. 18, T. 37 S., R. 3 W., at an elevation of 1850 feet by barometer. It is opened by 3 adits having a total length of about 450 feet. The lowest extends west about 100 feet and northwest about the same distance, with minor openings. The next tunnel above extends northeast, but is caved at 65 feet from the portal. It is a drift on a vertical quartz vein in a lead 6 to 30 inches wide in a country rock, which is a calcareous argillite. In the upper tunnel a crushed zone dips about 75° N. E.; it has a thickness of nearly a foot.

DOLLY VARDEN (gold) EAGLE CREEK DISTRICT BAKER COUNTY

This property, 8 miles southeast of Sanger and about the same distance north-northeast of Sparta, in Sec. 18, T. 7 S., R. 44 E., is a big outcrop of rusty quartz and silicified shale developed by irregular surface cuts and pits. No regular veins are seen. This group, which has been abandoned for some years, was relocated in 1915 by Chas. Carnahan and B. Martin, who report value per ton of \$7 to \$8 over a great width.

DON JUAN (gold) GREENHORN DISTRICT BAKER COUNTY

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.

DONNELLY PROSPECT (gold-silver-lead) WALLOWA DISTRICT WALLOWA COUNTY

Located about 1 mile south of Minam lake in about Sec. 31, T. 4 S., R. 44 E., at an elevation of 8500 feet. Small irregular quartz veinlets in a sheared zone 8 to 10 feet wide in granodiorite and an aplite-porphyry dike. Principal quartz stringer is about 6 inches wide containing galena, tetrahedrite, sphalerite and a small amount of chalcopyrite and reported high values of silver and gold.

An adit was started in 1914 to determine whether the smaller veinlets will unite with the larger one at some place below.

DOROTHEA MINE GREENBACK DISTRICT JOSEPHINE COUNTY

Dorothea (Marshall) mine is owned by Mrs. J. F. Reddy who purchased it from Glendale Mining & Milling Co.

The Marshall mine is located on the north side of Coyote creek near the N. W. corner of section 22, T. 33 S., R. 5 W., 5 miles east of the Pacific Highway, the nearest railway station being Leland. It has been opened by several adits and a shaft. A crosscut adit about 500 feet long is wholly in serpentine. A shaft about 100 feet deep exposes a good looking white quartz vein between a serpentine hanging wall and greenstone footwall striking E. and W. and dipping steeply to the N. A shearing movement has taken place since the vein was formed, approximately in the plane of the vein and involving portions of it in the crushed zone. On the footwall the better part of the vein is found which varies from 1 to 4 feet in width. An adit cuts the vein at about 150 feet in depth and from this level considerable stoping has been done. The mill has 5 stamps and a Fairbanks-Morse standard concentrating table driven with steam power.

DOUBLE EAGLE MINING COMPANY (gold) GREENHORN DIST. GRANT COUNTY

Office: The Dalles, Oregon. J. S. Fish, Pres.; T. J. Seufert, Sec.; J. C. Hostetler, Treas., 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 about 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.

DOUGLAS UMPQUA MINING COMPANY

This company was dissolved January 11, 1916, but reinstated October 27, 1916. Its office is Portland, Oregon.

DREXEL MINING COMPANY

This company was dissolved January 5, 1914, but reinstated November 4, 1916. Its office is Vale, Oregon.

DRY DIGGINGS (placer) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The placer gravels of Rogue river have been exploited as a source of gold for many years, but work has ceased almost entirely in the Grants Pass district. About 10 years ago the "Dry Diggings" a short distance above the county seat were the scene of considerable activity and a big dam across the river was constructed to aid in the work; after a few years of considerable output work ceased and very little has been done since that time. There are several other placer mines at various points along the river, but none of them has been a large producer. One difficulty in the way of developing important placer mines in this area has been the fact that in many deposits the rich gravel just above bedrock was buried too deeply by later sands and boulders.

DUCOMMUN PROPERTY WALDO DISTRICT JOSEPHINE COUNTY

See "Elephant or (Ducommun)" property.

EAGLE CREEK PLACERS EAGLE CREEK DISTRICT BAKER COUNTY

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

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

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

EAGLE MINE (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Eagle mine, 3 miles southeast of Gold Hill, adjoins the Millionaire on the west. It is opened by 4 shafts and at least 2 adits, but the workings are not extensive. An adit reveals stringers of quartz in black argillite and andesitic material. The mine is said to have produced some very high grade ore. It is now under lease, but not in operation.

EAGLE MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Eagle mine is 6 miles northeast of Merlin on the east side of Walker mountain in the S. W. $\frac{1}{4}$ Sec. 6, T. 35 S., R. 5 W., at an elevation of 2550 feet as measured by barometer. It is owned by Jim Rush and Herbert Corless of Grants Pass.

The country rocks here include argillite and a sheared pyroxenite or augite diorite rich in dark minerals, as well as some talc schist and black material, probably carbonaceous. The ore is quartzose vein material with very little sulphide. A vein strikes southwest and dips about 40° S. E. The mine has been opened by shafts and adits which are now caved and inaccessible. From the size of dumps it is probable that several hundred feet of underground work was done, but the mine has been idle for several years.

EAST EAGLE MINING & MILLING COMPANY (gold) EAGLE CREEK DISTRICT BAKER COUNTY

Local name, Miller & Lane group.

Office: Baker, Oregon. J. A. Thronson, Pres.; E. S. Platts, Sec.; J. A. Thronson, Treas. Capital stock, \$5000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

Located about 15 miles north of Sparta or 45 miles northeast of Baker, in N. W. part of T. 6 S., R. 44 E. (Sec. 5 probably), on the west side of the rather steep canyon of East Eagle creek at an elevation of about 5000 feet.

The region is well timbered. Four located claims are owned and 5 claims under bond and lease to the company.

The vein is of the saddle reef type, filling in the top of an anticline with a layer of greenstone below and a bed of argillite above. The axis of the anticline has a north-south direction and pitches to the north. Average width of vein is 4 feet and the average value is said to be \$8.50 per ton. Vein has been exposed by about 200 feet of tunnel along the crest of the fold. Cross-cuts and small tunnels have shown that the width of the fold, where occupied by the quartz, is about 100 feet. It is possible that this saddle-reef vein was fed by a fissure, and as the principal breaks in the vicinity strike east-west and dip north, the driving of the tunnel north along the axis of the fold, may bring the best results.

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

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

ECLIPSE COPPER MINING COMPANY

UNION COUNTY

Office: La Grande, Oregon. Julius Fisher, Pres.; Wm. B. Sargent, Sec.-Treas., both of La Grande. Capital stock, \$2,500,000; par value 25 cents; \$185,000 subscribed, issued and paid up. (1915 report).

EDWARDS AND GARRISON CLAIM (gold) UPPER APPLIGATE DIST. JACKSON CO.

Edwards and Garrison have a prospect about 2 miles from the head of Elliott creek, 30 miles south of Jacksonville and half a mile north of the California line. Small bunches of ore have been obtained from surface workings. The main vein is parallel with the schistosity of the chlorite schist country rock and is 9 to 12 inches thick. It consists largely of pyrite and gouge with only a little quartz; it strikes N. 55° E. and dips 30° N.W. An incline shaft goes down at an angle of 23° about 60 feet N. 60° W. The ore is said to assay about \$40 a ton, but some of the gold does not amalgamate readily. A fault striking N.E. cuts the vein but the displacement is only about 1 foot.

ELECTRIC MINING AND SMELTING COMPANY

NORTH SANTIAM DISTRICT

MARION COUNTY

Office: 218 Worcester Bldg., Portland. R. M. Russell, Sec. and Treas. Capital stock, \$1,000,000; par value \$1.00; all subscribed, issued and paid up. (1912 report). Dissolved April 6, 1914.

See "Consolidated Copper Mining and Power Company."

ELECTROLYTIC MINE (copper and gold)

WALLOWA COUNTY

Located in Sec. 3, T. 1 S., R. 50 E., on the Oregon side of the Snake river canyon, a few hundred feet from the stream, about 65 miles south of Lewiston, Idaho, and about 7 miles above Dry creek and 2 miles below Sommer's creek. Canyon very steep and rugged; no timber.

The region appears to be made up of altered basic volcanics (greenstones) cut by quartz veins and capped by recent basalt. The old lavas, which are now greenstones, may have originally been andesites. The quartz veins probably came from some cooling intrusive mass at depth, but the intrusion is probably somewhat distant, as the usual offshoots such as porphyry dikes are notably scarce.

Mineralization consists of fissure veins and fracture zones. In both cases it appears to be slight. The main vein is a regular fissure having a strike of N. 10° to 20° W., with a nearly vertical dip and an average width of 8 to 10 inches. A small amount of pyrite is the chief ore mineral. On the western side of this vein there is a fault breccia 4 to 5 feet wide, not mineralized and

probably post mineral. The vein has been traced on the surface for several hundred feet and the erosion of the vein and fault breccia has formed a narrow gorge. There is a 600-foot crosscut, which has not reached the vein. It will strike it at a depth of several hundred feet. Although no assays were available, the surface indications are such as would discourage the expenditure of much money in development work.

ELEPHANT or (DUCOMMUN) PROPERTY (copper) WALDO DIST. JOSEPHINE CO.

The Elephant or Ducommun property is located in the S. E. $\frac{1}{4}$ of Sec. 18, T. 40 S., R. 7 W., 3 miles northeast of Takilma. A 440-foot adit on this property shows some copper ore. The minerals found in the ore are marcasite, pyrite, chalcopyrite, chalcantite and gypsum.

ELK CREEK GOLD MINING COMPANY (gold) CORNUCOPIA DISTRICT BAKER CO.

Local name, The Robert Emmett.

Office: Union, Oregon. H. C. Susecoind, Pres., Nampa, Idaho; C. E. Davis, Sec.-Treas., Union, Oregon. Capital stock, \$50,000; par value \$1.00; \$28,000 subscribed and paid up; none issued. (1916 report).

Land consists of a quartz claim, the Robert Emmett, located about 1 mile northwest of Cornucopia and about 2 miles by wagon road up heavy grade from same.

Northward from the Red Jacket shoot the vein pinches in the hard schist of the backbone of the ridge, but opens again in the Emmett claim, which has been worked successfully on a moderate scale since 1899. A tramway connects it with a mill built on Elk creek. The elevation is 6,350 feet. The developments consist of a shaft 165 feet deep on the inclined, drained by a tunnel, and of drifts on two levels. The vein is similar to the Union-Companion, though only 1 to 2 feet thick. It contains a shoot of good ore; some of the partly oxidized ore near the surface, 100 feet south of the shaft, contains up to \$100 per ton. (Lindgren, p. 744)

For the last few years little work outside from the assessment has been done.

EL SENORA MINING COMPANY (gold) UPPER APPLGATE DIST. JACKSON CO.

Local name, El Senora.

Office: Applegate, Oregon. A. H. Ruelle, Pres., Seattle, Wash.; E. W. Shattuck, Treas., Applegate, Ore. Capital stock, \$500,000; par value \$1.00; Stock is entirely subscribed, issued and paid up. (1914 report).

Property consists of 12 located lode claims and 1 placer claim, and is located 3 miles southeast of Applegate in northern part of Sec. 34, T. 38 S., R. 4 W. The workings total about 1000 feet, part of which is caved and closed. The lowest entry was a shaft 130 feet deep and a level said to follow a 4-foot vein of low grade quartz ore for 200 feet. The next entry is an adit which crosscuts N. 60° E. for 80 feet and then drifts S. 45° E. for 70 feet. The vein shows 2 feet of quartz in argillite. Some gold is found also in seams in the country rock. About 100 yards to the southeast the next higher adit follows the vein S. 55° E. for 220 feet. Above this are two short adits and a shaft, where a pocket of ore was removed. The strike of the vein is not constant in all the adits, but it is apparently continuous; in one place it narrows to 1 inch of fault gouge. The company owns a 10-stamp mill, which is on the ground, but not erected. It was obtained from the Oregon Belle mine.

The management states that late development shows a 3½-foot vein that averages about \$12 per ton.

ELWILDA OR KRAMER GROUP (gold) GALICE DISTRICT JOSEPHINE COUNTY

The Elwilda or Kramer group is now owned by M. C. Page, of Seattle, who is continuing the development of the property. It is about 8 miles by trail from the Alameda mine and consists of 11 claims extending from Rogue river up Whiskey creek. The mill was formerly a rotary 4-stamp Parker mill;

it is now an arrastre run by a Pelton wheel. The group is opened chiefly at two places called the north and south "works." In both places the country rock is greenstone; at the latter it is cut by a dike of quartz monzonite aplite. At the south "works" 2 short adits disclose a quartz vein about 3 feet thick, which is much crushed and faulted. One fault strikes N. 67° E. and dips about 55° S. E. The chief vein strikes nearly east and dips about 60° northward. At the north "works" 2 adits open one or more veins, which vary considerably in strike and dip. The richest portion has a strike of N. 4° E. and a dip varying from 45° W. above the level to 78° W. below in a 40-foot winze. Near the breast a quartz vein strikes N. 20° E. and dips 70° N. W. The gold in the ore from this adit is reported to amount to \$5 a ton.

EMERSON PLACER **GRANTS PASS DISTRICT** **JOSEPHINE COUNTY**
See "Flanagan and Emerson" placer.

EMPIRE GOLD DREDGING AND MINING COMPANY (placer) **GRANT COUNTY**
CANYON DISTRICT

Office: 250½ Third St., Portland, Oregon. W. F. Burrell, Pres.; O. L. Kennedy, Sec.-Treas., both of Portland, Oregon. Capital stock, \$100,000; par value \$100; \$72,000 subscribed, issued and paid up. (1916 report).

This company owns the dredging ground in the John Day valley in the immediate vicinity of the town of John Day, and upon Canyon creek, between the towns of John Day and Canyon City. They began the operation of a standard dredge in June, 1916, and the dredge was constructed and floated within the corporation limits of the town of John Day, and is digging up Canyon creek toward Canyon City. Canyon creek and its immediate vicinity is credited by Federal authorities as having produced \$15,000,000 in placer gold. Although most of the upper gravels in the stream bed were worked over in the early days, a deposit as rich as was Canyon creek, handled by the methods then in vogue, must of necessity leave values sufficiently high to make dredging profitable. Besides, the failures of the workers of many separate claims to reach and clean to bedrock on account of water difficulties and disposal of gravel, must have left much gold easily recoverable with a modern dredge.

EMPIRE PROSPECT (gold) **CHINA DIGGINGS DISTRICT** **CURRY COUNTY**

This property lies about a quarter of a mile south of the Golden Dream claim, which is at the head of Slide creek. It is owned by W. G. Cooley and Ben Miller, of Harbor. It was not visited, but the deposit is said to consist of quartz stringers in porphyry (greenstone?). It is said to have been worked for at least 14 years, and was being actively developed during the summer of 1915. It is claimed that at least 2 feet of free milling gold ore averaging \$12 a ton is exposed.

EQUITY COPPER AND GOLD MINING COMPANY (gold-copper) **GRANT COUNTY**
QUARTZBURG DISTRICT

Local name, The Colorado mine, The Equity mine.

Office: Prairie City, Oregon. W. J. Hughes, Prairie City, Pres.; Mrs. Kate Palmer, Baker, Oregon, Treas.; G. J. Bowman, Baker, Sec. Capital stock, \$150,000; par value ten cents; all subscribed, issued and paid up. (1916 report).

This company's property of 6 claims is located in Sec. 2, T. 12 S., R. 33 E., about 7 miles northeast of Prairie City, Oregon, on Dixie creek. The vein on this property is similar in strike, dip, width, values and mineral content to that of the Present Need mine, owned by the Comer Mines Company. The developed ore is practically exhausted to creek level. Production for the year 1915 was \$369.95.

ESSEX LEAD AND SILVER MINING COMPANY**IDAHO**

Office: 314 Failing Bldg., Portland, Oregon. George L. Story, Pres.-Treas.; Chas. Hutchins, Sec., both of Portland, Oregon. Capital stock, \$200,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company's properties are located in the Beaver mining district, Shoshone county, Idaho.

EUREKA DISTRICT GOLD MINING COMPANY**WASHINGTON**

Office: 705 Chamber of Commerce Bldg., Portland, Oregon. Jonathan Bourne, Pres.; I. M. Arneson, Sec., both of 705 Chamber of Commerce Bldg., Portland, Oregon. Capital stock, \$2,500,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company's properties are located in the Eureka Mining District, Ferry County, Washington.

EUREKA MINE (gold)**ILLINOIS RIVER DISTRICT****JOSEPHINE COUNTY**

With reference to this property Diller says:

The Eureka mine on a branch of Soldier creek, about 12 miles northwest of Kerby, is owned by a company in Eureka, California. The property embraces 6 or more claims and is reached by trail only. There are probably 1,000 feet of underground workings, also air drills, electric lights, and a 10-stamp mill with concentrator and cyaniding plant now idle. The mine was operated more or less irregularly for about 4 years, beginning in 1901, with a Huntington mill. The output, though considerable, is not definitely known.

The country rocks are greenstone and serpentine and the ore occurs in irregular but abundant veins or bunches of quartz on the contact or near it in the adjacent greenstone. The quartz streaked with a dark ore mineral, reputed to be a telluride, is richest and is said to run as high as \$500 a ton. Such ore was rare and is not now available. The general average of ore is low, much of it about 40 cents a ton, and would not pay for working. The ribboned veins of quartz strike N. 50° W. and dip 75° NE. The contact has been worked 250 feet in depth and 500 feet in length horizontally.

EUREKA MINING, SMELTING AND POWER COMPANY (copper) (Washington corporation)**WALLOWA COUNTY**

Local name, Eureka mine.

A Washington corporation with offices at Clarkston, Washington. Wm. Struve, Almont, Iowa, Pres.; W. E. Howard, Clarkston, Wash., Sec.-Treas.; C. H. Zurcher, Enterprise, Ore., attorney-in-fact. Capital stock, \$2,000,000; par value \$1.00; all subscribed and paid up, \$838,515 issued. (1915 report).

The property was not visited, but Stevens' Copper Handbook of 1912-13 says: "Lands: 40 claims; patents applied for, but secretary reports (1913) property idle for several years, awaiting railway facilities." This property is located near the Snake river on the Oregon side about Sec. 14, T. 3 N., R. 50 E.

EXCHEQUER MINE (gold) LOWER APPLEGATE DISTRICT JOSEPHINE COUNTY

The Exchequer mine, 11 miles southeast of Grants Pass and 2 miles north of Provolt, is in Sec. 35, T. 37 S., R. 5 W., on a hill near the Applegate river. The lower adit is about 150 feet long in argillite; the drift is on a small vein which strikes N. 60° W. and dips about 70° N. E. Nearby a vertical shaft said to be 200 feet deep is now caved and full of water. The dump shows pyritized quartz and a vein at least a foot wide. The country rock here is greenstone. The Exchequer mine is owned by W. H. Flanagan, of Grants Pass. It was formerly equipped with a Huntington mill and a concentrator.

FAIRVIEW CLAIM (gold)**GOLD HILL DISTRICT****JACKSON COUNTY**

The Fairview claim, 5 miles southwest of Gold Hill, owned by Dr. C. R. Ray, of Medford, is in the N. W. ¼ Sec. 5, T. 37 S., R. 3 W., near the top of the ridge between Galls and Foots creeks at an elevation of 2950 feet by barometer. High grade ore is reported near the surface where a narrow vein of quartz with a little calcite, pyrite, and galena strikes N. 50° W. and

dips 77° N. E. into the hillside. Very little development has been accomplished here.

FARRELL GROUP (copper) HOMESTEAD DISTRICT BAKER COUNTY

L. D. Lilley and associates, of Baker, Oregon, secured a bond and lease upon this property, which was formerly owned by Ed. Farrell and sold to eastern people who worked the property for several years, but finally failed to do the annual assessment work and the property was relocated by J. W. Beckham.

This group is situated south of the Iron Dyke and is thought to be upon an extension of the Iron Dyke ledge. The property had a 400-foot crosscut and Mr. Lilley is engaged in continuing this tunnel to crosscut the ledge shown upon the surface and in the shallow workings above.

FAY CLAIM SIXES RIVER DISTRICT CURRY COUNTY

See "Crawford & Fay Claims."

FIDELITY COPPER COMPANY IDAHO

Office: 907 Wilcox Bldg., Portland, Oregon. Joseph M. Healy, Title & Trust Bldg., Portland, Pres.; L. B. Reeder, 907 Wilcox Bldg., Portland, Sec.-Treas. Capital stock, \$2,000,000; par value \$1.00; \$1,866,477 capital stock subscribed and issued; \$1,000,000 capital stock paid up by purchase of property. (1916 report).

This company's property, which consists of 37 claims, is located in the Seven Devils mining district, Adams county, Idaho, directly across Snake river from the MacDougall group and is of similar nature.

FIDELITY GROUP WALDO DISTRICT JOSEPHINE COUNTY

See "Roseburg and Fidelity" groups.

FIELD MUTUAL MINING COMPANY IDAHO

Office: 254 Alder St., Portland, Oregon. Al. W. Field, Pres.; Richard A. Field, Sec.-Treas., both of 254 Alder St., Portland. Capital stock, \$100,000; par value 25 cents; \$50,000 subscribed, \$4650 issued, \$2813 paid up. (1916 report).

This company's properties are located in Blaine county, Idaho.

FLAGSTAFF MINE (gold) VIRTUE DISTRICT BAKER COUNTY

The Flagstaff mine is owned by Boston people, Arthur Murphy having the controlling interest. At present it is under lease and bond by a Seattle syndicate. J. H. Sullivan is in charge of the mine.

It is located about 6 miles northeast of Baker in Sec. 5 T. 9 S., R. 41 E. The country is hilly and barren. The mine is situated on a small hill and the shafthouse forms a conspicuous landmark. There is an excellent wagon road from the mine to Baker.

The particular vicinity is near the contact of intrusive diorite into older greenstones. These rocks are overlain by recent basalt. Although the intrusive is more basic than the usual type, it represents a phase of the main granodiorite batholith. Its dark basic nature makes it hard to distinguish from the invaded greenstones. This difficulty is enhanced by the fact that the contact is somewhat shattered, large blocks of the greenstone being found surrounded by the intrusive. The usual accompaniment of porphyry dikes is present.

Mineralization occurs in distinct quartz fissure veins. One of these, called the Flagstaff vein, upon which the shaft has been sunk, strikes N. 30° E. and dips 60° to the S. E., and is a small persistent fissure with a maximum width of about 18 inches. It has been drifted upon for several hundred feet and much of it has been stoped. The values are said to be in small high grade shoots.

The main vein of the property, which is called "Big Ledge," intersects the Flagstaff vein at a point about 800 feet north of the shaft, has a strike varying from N. 15° W. to N. 35° W. with a dip of 60° to the east. This is a persistent and much larger vein than the Flagstaff vein, having a width of 5 to 8 feet of solid quartz for several hundred feet. The values are said to be evenly distributed and about \$16.00 per ton in gold.

There is another vein about 100 feet further north from the shaft called the "White Frost" vein, which has a strike of N. 30° W. and dipping at a high angle to the east. This vein is similar in size and values to the Flagstaff vein.

The development work consists of over 5000 feet of workings. It includes a shaft 760 feet on the Flagstaff vein with several hundred feet of drifts to the north and south at the 260-foot level and the 360-foot level. There is also about 100 feet of drift at the 560-foot level and there is an air raise to the surface from the 360-foot level about 400 feet north of the shaft. The Big Ledge vein is developed by drifts on the 360 and 260-foot levels, with an air raise to the surface near the north face of the 350-foot drift and in the widest part of the Big Ledge on the 360 level there is a winze 85 feet deep and a raise of about the same length.

The 3-compartment incline shaft has been put in excellent shape. There is a 20-stamp mill driven by steam power and a cyanide plant.

FLANAGAN AND EMERSON PLACER GRANTS PASS DIST. JOSEPHINE COUNTY

About 10 miles west and 3 miles north of Grants Pass the Flanagan and Emerson placer mine is located on a gravel terrace on the west side of Rogue river about 30 feet above the water. It is owned by Dr. W. H. Flanagan, of Grants Pass.

According to Diller:

The mine face exposes 50 feet of fine gravel containing a small amount of sand near the middle and top. On the river side of the mine a portion of the gravel appears to have been washed away and replaced by a later deposit. The slate bedrock is much twisted and faulted. The strike is N. 20° E. and the dip is 45° S. E.

Near this mine to the south in Secs 2 and 11, T. 36 S., R. 7 W., there are extensive deposits of alluvial gravels which have been tested by Clarence H. Mace. He reported 25 cents to \$1.60 per cubic yard with a channel 600 to 700 feet wide and the richest streaks on the concave side of the river. Conditions here seem to be favorable for the introduction of dredging. The gold is coarse with rough edges, which indicates that it has not traveled far. For the most part the boulders are small, averaging under 6 inches in diameter, and there is no clay except in part of the overburden. There are places along the present channel where the gravel is only 4 feet thick, and others where it is evidently at least 30 feet, but where the ancient channel is exposed by hydraulic operations it varies from 75 to 150 feet in thickness. Bedrock consists of upturned slate beds.

FLORENCE PROSPECT (zinc) CHETCO (MOUNT EMILY) DIST. CURRY COUNTY

The Florence prospect was located March 4, 1914, and is owned by Charles M. Warren. It is situated just below the crest on the northern slope of Mount Emily. The deposit is along the contact between metamorphosed Dothan sediments and rhyolite. The hornfels resulting from the metamorphism of the Dothan shale has been crushed, sheared, and silicified at this point, and in the crevices thus formed sphalerite and pyrrhotite have been deposited. The total width of the mineralized zone is about 8 feet; the strike is N. 35° E. and the dip 75° S. W. A sample taken across this mineralized zone proved to contain 3.57 per cent zinc and a trace of gold, while a sample consisting largely of pyrrhotite yielded but a trace of gold. It is certain that this ore would yield a high-grade zinc concentrate, but the only

opening on the vein consists of an open cut, and it is decidedly uncertain how extensive the deposit will prove to be. It seems likely, however, that the sulphides will be confined to points along the contact where an unusually great degree of crushing has occurred, and this will tend to give the deposit a "pockety" nature.

An eighth of a mile west of Florence prospect, across a small gulch, is a cliff the face of which is heavily iron-stained and covered with pot-holes. It proved on examination to consist of a brecciated mass of rhyolite containing rounded cavities and seams filled with pyrite and quartz. A sample of the sulphide yielded not a trace of gold, however.

FOREST CREEK MINING COMPANY (placer)

JACKSON COUNTY

Office: Henry Bldg., Portland, Oregon. D. W. Dobbins, Pres.; M. A. Brown, Sec.; Adelaide A. Lowden, Treas., all of Portland, Ore. Capital stock, \$50,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company owns 40 acres of placer ground in Jackson county. This is a new corporation and very little development work is done upon the property as yet. No production to date.

FORSTER AND THOMAS COPPER CLAIMS EAGLE CREEK DIST. BAKER COUNTY

See "The Sovereign Consolidated Copper Company."

FORTY-NINE DIGGINGS (placer)

ASHLAND DISTRICT

JACKSON COUNTY

The best known placer mine in the district is called the "Forty-nine diggings." It is about 2½ miles northwest of Ashland at the north end of the ridge between Wagner and Ashland creeks. Here the placer operations have extended at least 20 feet into an old conglomerate bedrock and the same distance into an older bedrock consisting of a series of andesitic flows, now much altered.

Upon weathering the rock becomes lighter colored, and curving lines of iron stain surround and accentuate lenticular or spheroidal forms of more compact material. In places the andesite seems to be amygdaloidal containing cavities filled by later calcite and other material. The flows strike S 60° W. and dip steeply westward and are overlaid by the nearly horizontal conglomerate, probably of Cretaceous age, which strikes S. 40° E. and dips about 70° N. E. This placer has not been in operation for several years.

The following description of the Forty-nine diggings was written by Frank M. Anderson:

The old placer mines near Phoenix, Oregon, were the property of the late E. K. Anderson, who formerly lived near Talent, Jackson county. They form a group lying about the northern end of a ridge of hills which constitute a spur of the Siskiyou mountains. Mining has been done along the eastern and northwestern flanks of this ridge, and gold in small quantities found in all the alluvial gravels of the vicinity. From about 1860 until recent years these mines were worked regularly for a few months during the winter and spring. Until 1895 they yielded generally from 60 to 150 ounces of gold annually, which ranged in value from \$16 to \$18 an ounce.

The gold was generally accompanied by considerable "black sand" (magnetic iron and other dark minerals) and some grains and nuggets of cinnabar. For the most part the gold was fine, ranging in size from "dust" to "flaxseed" gold, though a few nuggets of gold were found which weighed as much as 3 ounces or even more.

Much of the gold was more or less "rusty" and would not amalgamate freely, so that after all the gold obtainable by this means was removed from the black sand it still had a value of \$5 to \$8 a ton in gold.

FRASIER MINES (copper, gold and molybdenum) WALLOWA DIST. WALLOWA CO.

Local name, Frasier mine.

Office: 507 Broadway Bldg., Portland, Oregon. F. T. McBride, Pres.; F. R. McBride, Sec., both of Portland. Capital stock, \$15,000; par value \$10; \$7540 subscribed, issued and paid up. (1916 report).

The Frasier mine is on the high ridge which separates the headwaters of

the Imnaha from the west fork of the Wallowa. It is in about Sec. 7 T. 5 S., R. 45 E. at about 8000 feet elevation. It is about 18 miles south of Joseph and is reached by 6 miles of wagon road and 12 miles of trail along the west fork of the Wallowa river.

At the Frasier property we have a block of limestone or marble several hundred feet long, occupying the top of a ridge. This limestone outcrop is entirely surrounded by granodiorite and the contact between the two is an irregular ellipse, with its major axis that of the ridge's crest and its greatest vertical distance below the ridge at either side about 200 feet. The contact-metamorphic zone goes all the way round the limestone block, but the northern side of the ridge has the greater amount of mineralization.

The mineralized zone is from 20 to 50 feet wide. The principal gangue minerals are garnet, epidote, calcite and quartz. Much of the garnet and epidote is fine-grained, but when these typical contact-metamorphic minerals had the opportunity, as in vugs and small fissures, they formed into crystals of considerable size. Some of the garnets were found to have a curious zonal structure indicating a change of composition in the outer part of the crystals. Since their exterior is of different composition from their interior which was formed first, the depositing solution must have changed in composition during the slow building up of these crystal forms.

The ore minerals are chalcopyrite, pyrite and molybdenite. Chalcopyrite is found in a zone from six to eight feet wide near the actual plane of the contact in what appears to be altered granodiorite. Chalcopyrite is also found in bunches filling in the spaces between the fairly well formed zonal type of garnet crystals.

Molybdenite, with some chalcopyrite, occurs in the altered granodiorite alongside the chalcopyrite, and appears to be the result of fissuring within the contact-metamorphic zone after the zone had been at least partially formed. It appears likely that the feldspar, biotite or black mica, and the hornblende of the granodiorite had been nearly all replaced by silica; molybdenite afterward completing the replacement of these minerals. This highly siliceous molybdenite vein is from one to two feet wide.

There are also irregular lens-like quartz veins. Small amounts of chalcopyrite and epidote are found, besides the tabular and for the most part badly-formed crystals of molybdenite.

W. Sutton and associates, of Butte, began in 1914 the development of this interesting contact deposit, where considerable surface work had previously been done by Mr. Fraser. A crosscut tunnel 300 to 400 feet long is being driven to get well below the surface, not only to determine the extent and value of the deposit below, but to avoid trouble with snow at the present surface workings.

It is said that there is 20 to 25 cents in gold to each per cent of copper, and that samples contain copper up to moderately high percentages.

FREE AND EASY MINE (gold) WALDO DISTRICT JOSEPHINE COUNTY

Diller says:

The Siskiyou Sunset Mining and Development Company has a deserted mine, generally known as the Free and Easy, in the large serpentine area 2½ miles west of Kerby. Several tunnels and other openings were made in the serpentine on the south slope of the ridge, but they are now caved in. In the valley, a few hundred feet below the mine, there is a small Huntington mill long unused.

This company was dissolved Jan. 7, 1911.

FREE GOLD CLAIM ELK RIVER DISTRICT CURRY COUNTY

In Sec. 8, T. 33 S., R. 14 W., is the Free Gold Claim, owned by C. W. Curl, near the water's edge a few hundred yards below the mouth of Bald Mountain creek. A dacite dike cuts Colebrook schist near greenstone. Dike strikes S.

10° W. is vertical; 75 feet wide and becomes more siliceous toward its western side where on contact it is practically pure quartz in which free gold was seen occasionally. Chinese worked placer just below dike but not up stream from it.

FREEHOLD MINING SYNDICATE (placer) ILLINOIS RIVER DIST. JOSEPHINE CO.

Office: 506 McKay Bldg., Portland, Oregon. Samuel Weldon, pres.; T. J. Bernard, sec., both of Portland. Capital stock \$1,000,000; par value \$1.00; all subscribed, issued and paid up. (1914 report).

This company owns five placer claims about 24 miles northwest of Kerby, on Briggs creek, a branch of the Illinois river, 20 miles southwest of Galice. Nothing but assessment work done on this property for some time.

FREELAND CONSOLIDATED MINING COMPANY

NORTH SANTIAM DISTRICT

MARION COUNTY

Office: Salem, Oregon. Hugh Freeland, Salem, pres.; W. J. White, Dallas, sec. Capital stock \$2,000,000; par value, \$1.00; all subscribed, issued and paid up. (1912 report).

Dissolved March 25, 1914.

See "Consolidated Copper Mining and Power Company."

FRENCH DIGGINGS (placer)

GRANITE DISTRICT

GRANT COUNTY

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 6,800 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 6,000 feet.

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.

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 per cent 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.

FRY'S PROPERTY

COLLIER CREEK DISTRICT

CURRY COUNTY

See "Kessler & Frys" property.

GALICE CONSOLIDATED MINES COMPANY GALICE DIST. JOSEPHINE COUNTY

This company operated placer ground along Galice creek a number of years ago, but was dissolved January 14, 1908.

GALLAGHER GROUPS (gold)

WEATHERBY DISTRICT

BAKER COUNTY

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

The country rock consists of schists, argillites and greenstones all tilted at high angles. Much faulting and shattering has taken place. The gold is contained in quartz lenses of various sizes. The maximum width observed at the old Gallagher property was about 20 inches. Minute impregnations of quartz in argillite also contain gold. Many porphyry dikes were observed in the locality so that it is probable that the granitic intrusion is at no great depth below the surface. This property has been idle for 9 years. It is said to have produced \$30,000 within a short time from a small tonnage of ore.

The new Gallagher group about $\frac{1}{2}$ mile northeast of the old group has a crosscut upon it in which is seen a badly altered porphyry dike and many stringers of quartz in the adjoining argillite. A width of some 15 or 20 feet which includes the altered dike and stringers is reported to contain fair values in gold.

GARACHINE OIL COMPANY

PANAMA

Office: Medford, Oregon. George F. King, pres.; T. W. Miles, sec.; C. I. Hutchison, treas., all of Medford. Capital stock \$75,000; par value \$100; \$60,250 subscribed, issued and paid up. (1913 report).

This company's properties are in Panama.

GATES CLAIMS

WALDO DISTRICT

JOSEPHINE COUNTY

See "Tomlinson, Gates and Thomas" claims.

GAUTHIER CLAIMS (gold)

QUARTZBURG DISTRICT

GRANT COUNTY

About 3 miles north of the Standard mine in sec. 6, T. 12 S., R. 34 E. F. X. Gauthier is developing an altered volcanic tuff along the side of an intrusion of magnetiferous feldspathic porphyry.

The ore minerals containing gold occur in small veins in what is locally called a dike, but is probably an altered and shattered contact of the porphyry with the fragmental volcanic rock.

GEM CONSOLIDATED GOLD MINING COMPANY (gold) SPARTA DIST. BAKER CO.

Local name: "Gem Mine."

Office: Baker, Oregon. Mine office: Sparta. E. D. Geiser, pres.; F. E. Geiser, sec.-treas. Capital stock \$1,000,000, par value \$1.00, all subscribed, issued and paid up. (1916 report).

One mile west of Sparta in sec. 17, T. 8 S., R. 44 E., in rolling hills with sparse timber. Elevation 4000 feet. Wagon road to Baker, 30 miles. Lands, 1 patented claim and 9 located. Normal fissure vein in intrusive soda granite, strike N-NE. Dip 30° E.; developed to depth 500 feet on dip.

With reference to this property Lindgren says:

The Gem mine, located 2 miles west of Sparta, was worked in early days, a 10-stamp mill being erected in 1873. Two years afterwards the mill was removed to Connor Creek, and the mine was idle for a long time. The vein strikes north-south and its dip is 40° E. The old workings followed the vein to a depth of 100 feet or more on the dip. The new developments consist of a vertical shaft 179 feet deep, with drifts extending 150 to 200 feet from two levels. The vein shows sharply defined foot and hanging walls from 1 to 4 feet apart, between which lie crushed granite and streaks of quartz in some places 2 feet in width. The ore is normal coarse vein quartz, with free gold and a little pyrite and black zinc blende. Near the shaft the vein cuts a dike of granite-porphry without changing, but on the second level south it is squarely cut off by a basalt dike striking east-west and dipping 50° S., along which some faulting has also taken place. The vein will in all probability be found to continue, as before, beyond the dike.

Only assessment work is done at present. Interior Department ruled (1916) that property is mineral land against agricultural contestant. This contest has held up development. Property equipped with hoist and pumps and small amalgamating and concentrating mill with steam power with wood for fuel available nearby. The mine is operated intermittently and when visited in 1914 and 1916 was filled with water. Total production is not available, 1889-92, \$59,000. Vein narrow but rich.

GIBBS PROPERTY (gold) WEATHERBY DISTRICT BAKER COUNTY

Located about 4 miles northeast of Weatherby in about sec. 9, T. 12 S., R. 44 E. Country is hilly and for the most part barren, although timber is at no great distance to the northeast.

The geology of this immediate vicinity presents a contact between granodiorite and black argillite. The mineralization occurs in what might well be termed contact veins, consisting of irregular lenticular masses of quartz varying from a few inches to a foot in width at the contact of the granitic rock and the argillite. The quartz is now in a crushed condition due perhaps to later movement. Some of these masses are said to go as high as \$300 per ton. Their mode of occurrence make the blocking out of the ore costly.

GILBERTSON'S PROPERTY (gold) BOHEMIA DISTRICT LANE COUNTY

O. C. Gilbertson owns a group of claims located in secs. 13 and 14, T. 23 S., R. 1 E. The country rock is andesite. The vein is of the fractured zone type, having a N. 60° W. strike, and dipping to the S. 80°. The brecciated portion of the lode is from 3 to 6 feet wide and the chief mineralized portion about 1 foot. The chief ore minerals are chalcopyrite, galena, pyrite and sphalerite. In the oxidized portion some specular hematite and magnetite were noticed.

Development work consists of a 600 foot crosscut and 400 feet of drifts. The property has not been accurately sampled, but it was said that at a depth of 80 feet the 6 foot width of brecciated material had the value of \$11.00 per ton.

GILKESON CLAIMS (copper) EAGLE CREEK DISTRICT BAKER COUNTY

See "Copper Butte Group."

GIRAFFE MINING AND MILLING COMPANY (gold) MORMON BASIN BAKER CO.

Office: Miller, Oregon. Geo. Cartwright, pres.; A. O. Weatherman, sec.; Grace Nichols, treas. Capital stock \$150,000; par value \$1.00. \$75,000 subscribed, issued and paid up. (1916 report).

This company owns 7 claims on the east slope of Clarks creek in sec. 31, T. 12 S., R. 42 E., about 1½ miles north of the Humboldt mine. The ore is a narrow mineralized granodiorite porphyry dike in a country which is largely argillite but also has serpentine and dikes of basalt. A considerable body of lime is a short distance to the north of the property and granodiorite to the east.

On the Giraffe claim No. 1 a drift upon the dike was made from which 200 tons were milled and \$7.50 per ton was recovered on the plates. A recent independent sampling of this drift gave an average of \$4.20 per ton. About 750 feet north of the above drift, on the Giraffe No. 2, a crosscut tunnel cuts the dike at a depth of 85 feet where the values are about the same as above. A crosscut is being driven on this claim to cut the dike at a depth of 300 feet. This crosscut will be about 500 feet long and it is now about half way in.

This information was furnished by officers of the company.

GLADE CONSOLIDATED GOLD MINING COMPANY, LTD. (Idaho corporation)

Office: Buhl, Idaho. Ira Brackett, Rogerson, Idaho, pres.; Chas. D. Snyder, Buhl, Idaho, sec.-treas.; John C. Bolton, New Bridge, Oregon, attorney-in-fact. Capital stock \$50,000; par value \$1.00; \$47,300 subscribed, issued and paid up. (1916 report).

GLEASON'S PROPERTY (gold) WEATHERBY DISTRICT BAKER COUNTY

Located about 4 miles northeast of Weatherby in about sec. 9, T. 12 S., R. 44 E. There is a fairly good wagon road to the railroad at Weatherby. Country is hilly and for the most part barren, although timber is at no great distance to the northeast.

The country rock is granodiorite, cut by recent tertiary basalt dikes. (On this property there is one 75 feet wide).

The mineralization is in a quartz fissure vein varying from a few inches to a foot or more in width. The strike is north and south and the dip is 80° W. Some siderite occurs in the quartz and this iron carbonate might be mistaken for scheelite.

There has been considerable development work consisting of a cross-cut tunnel, drifts, shallow shafts and some stoping but no information as to values are available. There is a small stamp mill on the property driven by an oil engine.

GLENDALDE MINING AND MILLING COMPANY (gold)
GREENBACK DISTRICT

JOSEPHINE COUNTY

Local name: "Marshall Mine."

Office: Glendale, Oregon. N. Campbell, U. S. Land Office, Portland, Ore., pres.; H. G. Sonnemann, 387½ East Burnside, Portland, sec.-treas. Capital stock \$50,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This mine was recently sold to Mrs. J. F. Reddy, of Grants Pass, and now goes by the name of "Dorothea Mine."

GLEN DITCH MINE (placer) **GOLD HILL DISTRICT** **JACKSON COUNTY**

The Glen Ditch mine, 15 miles southwest of Gold Hill, is near the head of the right fork of Foothills creek. It is owned by Boling Brothers. The stream bed has been followed for some distance, but much good ground remains to be worked. The gravels are about 15 feet thick.

GOLCONDA MINE (gold) **CRACKER CREEK DISTRICT** **BAKER COUNTY**

Owned by C. S. Jackson, Portland, Oregon. There has been no activity at this property since 1914. A description of this property on North Pole Columbia lode is found under "Columbia Gold Mining Company," to which the reader is referred.

GOLCONDA MINE (gold) **LOWER APPLIGATE DISTRICT** **JOSEPHINE COUNTY**

The Golconda mine is 11 miles east of Grants Pass and about 2½ miles northwest of Provolt in sec. 34, T. 37 S., R. 5 W., at an elevation of about 1500 feet. It is equipped with a 3-stamp mill with a plate, now partly dismantled. Two adits were run into the hill, but they are now caved shut. The country rocks are quartzite and argillite cut by intrusions of aplite and tonalite, the main area of the latter being apparently to the south.

GOLCONDA MINE (chromite) **WALDO DISTRICT** **JOSEPHINE COUNTY**

The Golconda mine is located in sec. 17, T. 40 S., R. 7 W., 6 miles northeast of Takilma. The property consists of 2 claims held by location. Locators and operators are D. W. Collard and son, G. W. Collard, of Holland, and O. R. Moore of Salem.

The ore body as far as developed seems to be a more or less lens-shaped mass of chromite in serpentine about 33 feet thick with approximately parallel walls, striking N. 15° E. and dipping about 65° E.

The present development of the property consists of a small open cut from which an underhand stope has been made some 40 feet wide, 65° to the east and following the deposit on its dip some 40 or 50 feet.

This property has been an important shipper of chrome iron ore during the past summer, having shipped approximately 2000 tons, which the management states averaged about 40 per cent chromium oxide (Cr₂O₃). The ore was hauled from the property about 25 miles to Waters Creek station, the temporary terminus of the California-Oregon Coast Railway. The chromite varies in amount of chromium oxide in different parts of the mass and the management has had some difficulty in mining the material in such a way that the higher grade chromite could be conveniently sorted out. The indi-

cations are that a good body of chromite can be proven on this property by more extensive and systematic underground development.

GOLD AND PLATINUM MINES COMPANY (placer) WALDO DIST. JOSEPHINE CO.

Office: Grants Pass, Oregon. I. F. Peck, Pres.; Sec.-Treas. vacant. Capital stock, \$1,000,000; par value \$1.00; \$500,000 subscribed, issued and paid up. (1916 report).

This company was formed in January, 1916, and has 1280 acres of placer association claims on Cave creek, in Josephine county. The development work consists of a dam 80 feet long by 9 feet high, about a 350-foot flume, 400-foot tail race, sluice boxes and camp equipment.

GOLD BEACH METAL COMPANY

Office: Astoria, Oregon. C. G. Palmberg, Pres.; J. M. Anderson, Sec.-Treas., both of Astoria, Oregon. Capital stock, \$6000; par value \$100; all subscribed, issued and paid up. (1916 report).

GOLD BAR MINE (placer) AGNESS DISTRICT CURRY COUNTY

This property is located at the old postoffice of Illahe, three-quarters of a mile below the present postoffice of the same name. It is on the north-western side of the Rogue and is owned by T. W. Billings.

Mr. Billings states that the first work on the property was done in 1856, and that the present ditch was started 11 years ago by H. J. Russell, who began to mine 7 years ago. The present owner bought the property from Russell's heirs on October 6, 1911, and it has been worked every winter since then. He says he took out \$156 in one month the first year, and that during the second year he cleaned up \$300 in gold dust, and stored 7½ tons of sand averaging \$272 a ton, which was subsequently washed away. During the third winter Post and G. P. Murch tried to use a Sweet gold machine on the property, but the result was unsatisfactory, as there was so much clay in the gravel that the machine became badly clogged.

That portion of the gravel which has been most extensively mined averages 9 feet thick and is covered with about 4 feet of overburden. It is an old high terrace, and the owner claims that at least 2 other such terraces or channels exist on the property. Several engineers have examined the property, and one named Post claimed that the gravel averages 40 cents per yard in gold. Another named G. P. Murch claimed that it ran only 25 cents per yard. Most of the gold is fairly coarse, and of a flaky nature. The larger pieces are found near bedrock and some of these are worth as much as 25 cents. No attempt to save platinum was made until the winter of 1914-15. During an 80 hours' run made then, a quarter of an ounce of this metal was secured. The bedrock is black Eocene shale, together with some sandstone.

A thousand miner's inches of water is brought to the property in a ditch. This gives 180 feet to 200 feet fall where Mr. Billings has done most of his work, and 100 feet fall to the higher bars.

GOLD BASIN PLACERS CHINA DIGGINGS DISTRICT CURRY COUNTY

Diller describes the deposits here as follows:

About the head of Tin Cup creek, fifteen miles northwest of Kerby, there is a V-shaped remnant of the Klamath peneplain known as Gold Basin on a large mass of granodiorite. The apex of the V points east, and across its southern arm is a broad, shallow valley filled by an old stream bed running approximately N. 20° W. The surface plain of the stream bed is more than 1000 feet in width and 2000 feet in length, and is limited at both ends by deep, rugged canyons. The gravel has a thickness of 110 feet where best exposed on the steep southern slope. Near the bottom the gravel, though somewhat decomposed, is more or less firmly cemented, and this condition exists throughout the mass. It has been tunneled on bed-rock for thirty feet. The material is generally coarse, mostly cobblestones up to boulders 4½ feet in diameter mixed with pebbles and sand. There are no layers of sand to afford definite evidence of stratification. The pebbles are well rounded and are for the most part

composed of basic eruptive rocks, greenstone, gabbro, peridotite, and pyroxenite, with some of granite. Though generally greenish, they are in places colored reddish by a surface deposit of oxide of iron. The top portion of the deposit is finer, with some fine gravel capped by a reddish soil. Wherever I saw the pebbles in place the course of the stream was not clearly indicated by their position, though they appeared to be inclined southward, and it is believed that the stream came from that direction. The gravel was tested in 1875 or 1876 by sinking a shaft (now filled with water within twenty feet of the surface) and found to contain very little gold. Most that was found is said to have been in the fine material of the surface.

The only available water is snow water, which is obtainable only in small amounts during a short season. It is gathered by a mile or more of ditch, but reaches the mine with scarcely 15 feet of head, and only a small amount of gravel was mined before work was suspended.

GOLD BUG MINE (gold) GALICE (MT. REUBEN) DIST. JOSEPHINE COUNTY

The Gold Bug mine is on Whiskey creek in T. 33 S., R. 8 W. near Mount Reuben at elevations of 2400 to 2600 feet as measured by aneroid barometer. The old main adit is now completely blocked by fallen timbers at about 350 feet from the portal. The vein contained gold-bearing quartz with some pyrite and chalcopyrite. The vein was only 1 to 2 feet wide where seen, but even this was stoped out, and thicker vein quartz was reported farther in. The country rock of the old main adit is an andesite containing phenocrysts of plagioclase feldspar in a matrix of plagioclase, green biotite, isotropic chloritic material, and a little magnetite and epidote. The illustration is a copy of an old mine map showing a plan and a vertical section of the old workings.

A narrow dike of serpentine may be observed crossing the road within a quarter mile of the mine. Next to the dike the enclosing andesite is considerably altered to epidote, chlorite and quartz. An adit near this outcrop drifts 100 feet on a fissure 1 to 4 feet wide containing 6 inches to 2 feet of quartz striking N. 5° E. and dipping 45° E. The mine is now owned by Romig and Neal. A new incline shaft shows a quartz vein striking N. 35° W. and dipping 70° S. W. The vein-filling here is 12 to 14 inches thick and chiefly quartz stained by chrysocolla. A new crosscut adit extends N. 21° E. about 100 feet in andesite. Work was in progress here in the summer of 1913. The mine is connected with the railroad at Reuben Spur by a good mountain road.

GOLD BUG MINING COMPANY GRANITE DISTRICT GRANT COUNTY

Office: Granite, Oregon. N. E. Mighill, Marshalltown, Iowa, Pres.; Chas. Spear, Des Moines, Iowa, Sec.-Treas. Capital stock, \$1,500,000; par value \$1; \$1,200,000 subscribed, issued and paid up. (1913 report).

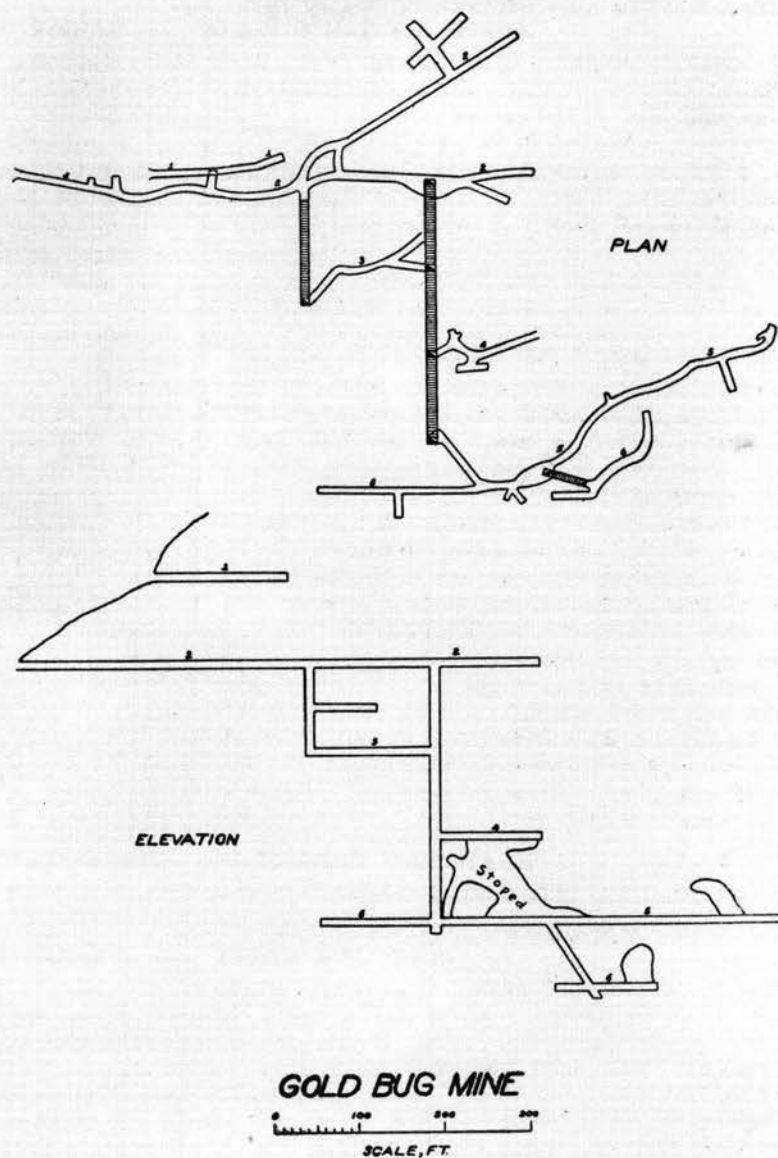
This property is located on Rabbit creek. Property not visited, probably moribund. Dissolved by proclamation in January, 1917.

GOLD COIN PLACER WEATHERBY DISTRICT BAKER COUNTY

This property is located about 2 miles southwest of the Gold Ridge, about ½ mile north of the Rye valley wagon road and 8 miles from Durkee. It is almost at the summit of the ridge that lies between the Rye valley road and the Gold Ridge mine. It occupies the southern side of the hill and reaches an elevation of about 500 feet above the road.

The gold is found in gravel beds belonging to the Tertiary Lake Bed formation. The beds are tilted and somewhat faulted. They consist of pebbles of quartz, flint, greenstone, granite, rhyolite, and volcanic tuff. The pebbles are rounded and vary in size from 3 to 4 inches down to sand. The finer material is usually granular, although some clay is present in places interbedded with the gravels.

There are many other placers in this vicinity, but for the most part they have been worked in a small way.



Plan and elevation of old workings of Gold Bug mine

GOLD COIN MINE (gold) GREENBACK DISTRICT JOSEPHINE COUNTY

The Gold Coin mine is about half a mile northeast of the Martha mine in Sec. 22, T. 33 S., R. 5 W. and is reached by the wagon road up Coyote creek. It is opened by 3 adits having a total length of about 450 feet; all 3 are in greenstone and serpentine and disclose no well defined vein, but instead numerous bunches and stringers of pyritic ore in calcite and quartz in serpentine. The pyrite also extends into the serpentine irregularly. In places the serpentine is so penetrated by calcite that the rock is properly designated an ophecalcite. This mine is equipped with a 3-stamp mill.

GOLD CREEK MINING AND MILLING COMPANY (gold, etc.)**NORTH SANTIAM DISTRICT****MARION COUNTY**

Office: Salem, Oregon. Otto Hansen, Pres.; W. I. Staley, Sec. and Treas., both of Salem, Oregon. Capital stock, \$3,500,000; par value \$1; all subscribed, issued and paid up. (1916 report).

The property is located in Sec. 18, T. 8 S., R. 5 E., about 16 miles northeast of Gates, a station on the Southern Pacific railway. It is on Gold creek, a branch of the Little North Fork of the Santiam, and consists of 17 claims, containing about 340 acres. A wagon road is built to within 3 miles of the property, and there is a good trail from the end of the wagon road. The elevation is between 2200 and 2900 feet.

The sulphide minerals, usually massive, are pyrite, chalcopyrite, galena and sphalerite. The country rock is andesite, and the vein exposed on this property in the upper Wall Street tunnel is well mineralized and from 1 to several feet wide and at the breast is the full width of the wide drift.

Most of the development on the property has been confined to a long crosscut tunnel, which is now in about 1500 feet, it being planned to cut the Wall Street vein with this tunnel at a distance of 2000 feet from the portal at a depth of about 600 feet. It seems unfortunate that so much money has been spent on the long crosscut on this property, when development on the Wall Street vein could have continued the blocking out of ore. The financing of this long crosscut has been difficult, the expense being greater than was at first estimated, and even if it were continued to the point where it is supposed to intersect the Wall Street tunnel, it is possible it would be disappointing, for the reason that the vertical distance is so great below the upper development that it might not be known just when the vein was cut. Numerous veins and stringers of varying sizes are usually found in such crosscuts and if the Wall Street vein should be intersected at a lean or narrow place, uncertainty would result and might be the means of unjustly condemning the property. Improvement and tunnel work to amount of about \$4000 was done in 1915.

GOLD DRIFT MINE**GRANTS PASS DISTRICT****JOSEPHINE COUNTY**

For description see "The Oro Fino Mine."

GOLDEN CHARIOT MINING AND MILLING COMPANY (gold)**SUMPTER DISTRICT****BAKER COUNTY**

Local name, Golden Chariot.

Office: Sumpter, Oregon. Chas. Wiedemann, Newport, Ky., Pres.; Oliver E. Conner, Jr., Sumpter, Sec.-Treas. Capital stock, \$350,000; par value \$1; \$300,000 subscribed, issued and paid up. (1916 report).

This company took over the old Gold Chariot (Tri-State Mining & Milling Co.) prospect, which is located in Sec. 34, T. 9 S., R. 37 E., at an elevation of about 4500 feet and upon gently rolling foothills about 2 miles east of Sumpter.

The property is developed by a single compartment shaft and steam power is used with wood for fuel. The country rock is for the most part a hard blue limestone with here and there a small amount of argillite or argillaceous limestone. The ore is not in a vein, but is in a silicified zone which has a general east and west strike. On the surface this zone is said to be narrow, but upon the 210-foot level where the diamond drilling is being done it is about 6 feet wide. This level is developed by a drift a few feet to the east and about 70 feet to the west. A small amount of ore has been stoped from the west end and a core drill with chilled steel shot as cutters was in operation during the summer of 1916.

Manager Conner continued the core drilling of the ore to depths of 500 feet from the 210-foot level until a sufficient number of drill holes had been

made to determine the extent of the ore. November reports state that the winze, which is being sunk from the 200 level, is still in free milling ore of good value.

GOLDEN DREAM CLAIM (gold) CHINA DIGGINGS DISTRICT CURRY COUNTY
See "Higgins Mine."

GOLDEN EAGLE MINING COMPANY (gold) GREENHORN DIST. BAKER CO.

Local name, Golden Eagle mine.

Office: The Dalles, Oregon. J. S. Fish, Pres.; J. C. Hostetler, Sec.-Treas., both of The Dalles. Capital stock, \$441,000; par value \$1; all subscribed, issued and paid up. (1916 report).

The company's claims are the Golden Eagle, Poorman, Mammoth, Comstock, Yellow Jacket, Danae, Harold and Crow Fractional. Several unique veins are explored by the workings of this mine, which extend under a prominent ridge west of the lower canon of Greenhorn creek, about 2 miles southeast of the town of Greenhorn. The mine has been worked in a small way from time to time, and a total production of \$75,000 is reported. The development comprises 3 tunnels and an intermediate drift, aggregating about 2600 feet. The vertical range of exploration is 175 feet, in addition to a shaft (No. 1) 75 feet deep below the lowest tunnel.

The country rock is serpentine derived from peridotite in which there are a number of large blocks of altered gabbro. Evidence elsewhere in the region indicates that the gabbro blocks were caught in the peridotite at the time of its intrusion. Altered gabbro is found only at one place underground. The workings explore a number of non-persistent fissures, three of which are ore-bearing and the others barren. At one place, an ore-bearing fissure terminates against a barren fissure in such a manner as to suggest that the latter is a post-mineral fault. Further consideration leads to the conclusion that all are contemporaneous, though there is other evidence of post-mineral movement. The barren fissures cut the serpentine in an irregular manner, but the three that have yielded ore form a branching system. Of these, No. 2 is the dominant fissure and has been explored almost continuously from the surface to a depth of 200 feet. It trends N. 30° W. to N. 60° W. and dips 40° to 50° N. E. No. 1, a branch of No. 2, dropped into the footwall between the first and second tunnels, though it has not been found below this tunnel. No. 3 is similar, leaving No. 2 below the second tunnel. The most productive shoots have been on No. 1 and No. 2 above the intermediate level and on the No. 3 vein.

The shoot on vein No. 2 has been a quartz lens which attains a maximum width of 3 feet in a winze below No. 3 tunnel. On this level, the quartz contains a small amount of chalcopyrite and one of its oxidation products, chrysocolla. Fifteen tons of this material yielded \$22 to the ton in gold. The shoots on the other veins are lenses of coarse, cream-colored dolomite with a little galena that replaces the dolomite along small fractures. Gold, about 850 fine, occurs as films along one wall or fills cleavage cracks in the dolomite adjacent to the walls. Free gold is common in the superficial workings and above the No. 2 tunnel a single sheet of gold measuring 4 inches long, 3 inches wide, and half an inch thick, is reported. One showing considerable galena is usually higher in grade than the average. The shoot on No. 3 vein has been stoped for a distance of 130 feet on No. 3 tunnel level, as well as to a point 65 feet above the level, and in No. 2 shaft to a depth of 20 feet. Within this area, the width has ranged from a maximum of 18 inches to half an inch, the lowest that pays to mine, and the average has been 6 inches. It is estimated that the ore from this shoot yielded \$175 to the ton in gold, though the ore from an area 20 by 50 feet below the level yielded \$800 to the ton. A portion of the stope above the level, 35 by 65

feet, yielded \$35,000 in gold. None of the shoots have been found in the drifts from No. 1 shaft, which is 75 feet deep and now filled with water.

It is reported that the presence of manganese oxide, limonite or chrysocolla indicates ore of good grade. Dendritic films of manganese oxide were observed at a number of places in the lowest tunnel including the extreme limits of work and are common in the upper tunnels. Specimens from the face of the intermediate level show angular fragments of dolomite cemented by chalcedony and stained by numerous dendrites of manganese oxide.

The mine is not accessible below the lower limits of oxidation, but from textural evidence it is highly probable that a portion of the gold of the richer ore has been introduced through superficial enrichment.

GOLDEN GATE MINING COMPANY (gold) (Arizona corporation)

GREENHORN DISTRICT

GRANT COUNTY

Local name, Golden Gate mine.

Office: 145½ South Main St., Marion, Ohio. M. F. Douce, Pres.; John F. Lust, Treas., both of Marion, Ohio; G. L. Bender, Greenhorn, Oregon, Sec.-Attorney in Fact; Fred L. Daines, Greenhorn, Oregon, Managing Agent. Capital stock, \$1,500,000; par value \$1; \$1,350,000 subscribed, issued and paid up. (1914 report).

The Golden Gate mine, 2 miles north of Greenhorn, has 3 veins upon the property. The Golden Gate and Belcher veins have nearly all of the development. The 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.

The country rock next to the Belcher vein is in greenstone and greenstone breccia. The greenstone is a fine-grained greenish-colored rock. Its appearance indicates that originally it was an andesite. The breccia is grayish-green in color and the angular fragments an inch or more in diameter consist of dense, almost purplish-colored, rock. These fragments are probably trachytic in composition. The matrix is a rather indeterminable mass which seems to consist of a more or less granular aggregate, now nearly obscured by the alteration products, chlorite and calcite. It has been badly altered by surface weathering and the oxidation is quite deep.

This vein strikes N.-NE. and dips steeply eastward. The quartz is lenticular, with a maximum width of 3 or 4 feet, diminishing in places to a streak of gouge. There are 2 tunnels upon the vein, the upper some 800 feet long and the lower, together with crosscuts and raises, amounts to some 2400 feet. The shoots said to contain the best ore are found not very far from the mouth of the lower tunnel. The two shoots are about 225 feet and 60 feet long, with a maximum width of 20 inches. Some distance farther in is a third shoot, with much less quartz and about 200 feet long, with a maximum width of about 3½ feet. A 10-stamp mill was erected in 1914 and began to mill the ore from Belcher vein in February, 1915. It was operated for a time, but without much success.

GOLDEN GATE PLACER MINES

IDAHO

Office: Pendleton, Oregon. C. E. Penland, Pres.; B. Parlett, Sec.; J. T. Lamberth, Treas., all of Pendleton, Oregon. Capital stock, \$75,000; par value \$1.00; \$59,053 subscribed, issued and paid up. (1916 report).

This company's property is located in Idaho county, Idaho.

GOLDEN GLOW MINING COMPANY

IDAHO

Office: 403 Commercial Bldg., Portland, Oregon. Thos. Papworth, 403 Commercial Bldg., Portland, Pres.-Sec.-Treas. Capital stock, \$750,000; par value 50 cents; \$629,917 subscribed, issued and paid up. (1916 report).

This company's properties are located near Ketchum, Blaine county, Idaho.

GOLDEN RULE CONSOLIDATED MINING AND MILLING CO. (gold)**BOHEMIA DISTRICT****LANE COUNTY**

Office: Salem, Oregon. William Wechter, Pres.; C. L. Johnson, Salem, Sec. Amount of capital stock, \$500,000; par value 5 cents; all subscribed, issued and paid up. (1916 report).

Property consists of 26 claims, located in Sec. 5, T. 23 S., R. 2 E., about 3 miles northeast of Bohemia postoffice, which is about 15 miles southeast of Disston, the terminus of a 20-mile branch railroad from Cottage Grove. This property is inactive.

GOLDEN STANDARD MINING COMPANY (gold) GOLD HILL DIST. JACKSON CO.

Local name, Kubli mine.

Office: 308 Commercial Block, Portland, Oregon. K. K. Kubli, 84 Fourth St., Portland, Pres.; E. B. Wilson, 308 Commercial Block, Portland, Sec.; E. J. Kubli, Jacksonville, Ore., Treas. Capital stock, \$100,000; par value \$100; all subscribed and issued; \$80,000 paid up. (1914 report).

This company has 81.688 acres of patented land in the Galls creek mining district of Jackson county. The property is known as the Kubli mine and is located in the N. W. $\frac{1}{4}$ Sec. 5, T. 37 S., R. 3 W., at an elevation of 2700 feet by barometer. A narrow vein, said to have been very rich, is opened for about 200 feet; it is 1 to 18 inches wide, but only 1 to 6 inches in quartz; the vein strikes about east and dips 60° N. The Kubli mill is to the east near the bottom of the hill; it has 2 stamps with triple discharge, a divided plate 4 by 10 feet, and a concentrating table. In the gully nearby there is a small outcrop of tonalite and a border of contact hornblende rock. The composition of this contact phase is given below.

Composition of Contact Rock, Near Kubli Mill, Galls Creek

(S. W. French, analyst)

		Approximate mineral composition	
SiO ₂	47.42	Hornblende	57.5
TiO ₂	1.01	Plagioclase	42.4
Al ₂ O ₃	20.56	(Ab, An)	
Fe ₂ O ₃	1.19		99.9
FeO	5.10		
MgO	7.08		
CaO	14.04		
Na ₂ O	1.80		
K ₂ O .....	.66		
H ₂ O+	1.36		
H ₂ O- .....	.08		

100.30

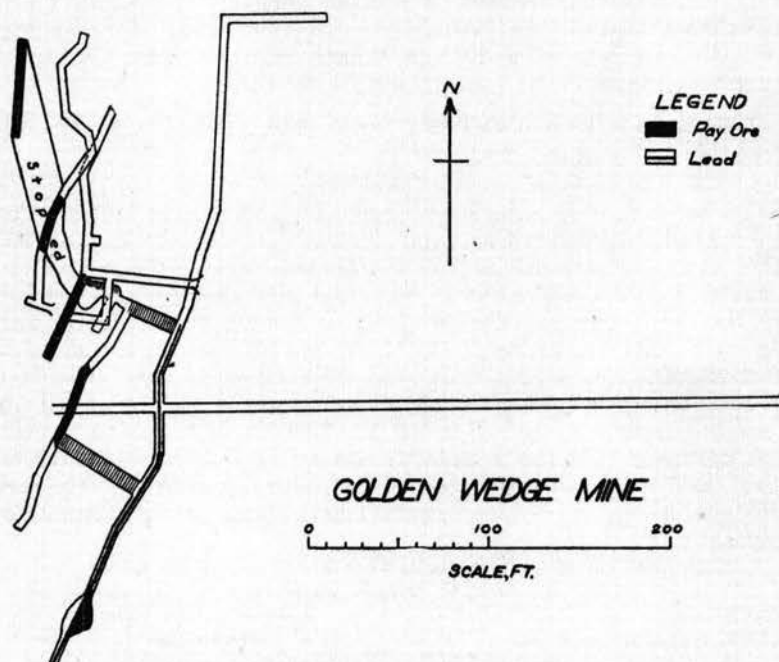
The mine is not in operation at the present time.

GOLDEN WEDGE MINE (gold)**GALICE DISTRICT****JOSEPHINE COUNTY**

The Golden Wedge mine is about 4 miles northwest of Galice on Bailey gulch. It is said to have been discovered by Mr. Hutchins in 1893. About 1908 the mine passed into the control of the Gold Road Mining & Milling Company, which was reorganized about 1911 as the Bailey Gulch Mining & Milling Company. Diller suggests that the total production of this mine may have reached \$50,000 and that future production may result if the Oriole fault is found. The main ore body is opened by about 1200 feet of underground workings, reaching a depth of about 500 feet on the incline. The lode strikes about N 20° E. and dips 50°-60° E. The ore body pitches southward at an angle of about 20°. According to Diller, the "quartz veins and lenses in the sheared greenstone are irregular, as if folded, and many of the quartz lenses or kidneys that have a covering of graphitic material with grains of pyrite are said to average \$10 to \$20 a ton in gold. Considerable ore has been stoped out of a belt ranging from 16 inches to 5 feet. The graphitic material interferes with handling the ore." The country rock here

is a greenstone with intrusions of dacite, containing abundant dark green hornblende with fine granular quartz, sericitized plagioclase, and unusually abundant granular titanite.

An adit near the mill on Bailey gulch is (1913) being extended. It exposes a thick fault gouge, which suggests an important fault. The gouge is grayish



Plan of main workings of Golden Wedge mine

blue when dry and nearly black and soft when wet. It consists chiefly of quartz, siderite, pyrite and sericite, and is therefore finely divided vein material. The hanging wall is serpentine; on the other side the same rock is sheared and mineralized, containing bunches and stringers of quartz. When seen this adit extended southerly about 220 feet; the vein near the breast strikes N. 10° W. and dips 88° E.

The Golden Wedge is equipped with a 10-stamp mill, having two more 2-stamp batteries not in condition to use, and also 7-foot amalgamating plates, a crusher, an air compressor, 2 Pelton wheels, and 12 tanks used as a 25-ton cyanide plant. Power is available only during the wet season.

GOLD HILL AND BOHEMIA MINING COMPANY (placer)
GOLD HILL DISTRICT JACKSON COUNTY

Local name, Red Oak mine, Gold Bank.

Office: 819 Chamber of Commerce Bldg., Portland, Oregon. J. M. Leiter, Pres.; Samuel Weldon, Sec.; I. G. Davidson, Treas., all of Portland, Oregon. Capital stock, \$100,000; par value 10 cents; all subscribed, issued and paid up. (1916 report).

This company has 80 acres of patented placer ground 3 miles north of Golden on Sardine creek. There is no activity at the property.

GOLD HILL PLACERS GOLD HILL DISTRICT JACKSON COUNTY

The placer deposits 5 miles southeast of Gold Hill are all closely associated with existing streams, being either in the present stream beds or on terraces not many feet above them. Mining is carried on chiefly during the

wet season of winter or early spring. A few of the placers have been equipped with dredges, but hydraulic mining is the prevalent method.

On Kane creek placers have never been extensive, but an electric dredge was under construction in 1908 for use in the S. E. $\frac{1}{4}$ Sec. 36; T. 36 S., R. 3 W. The capacity was 500 cubic yards in a 10-hour day. The power was obtained from the dam on Rogue river at Ray Gold; the material of the deposit is fine grained clay and gravel with few boulders; the bedrock is an altered slate. Since 1908 very little has been done on this project.

GOLD HILL "POCKET"**GOLD HILL DISTRICT****JACKSON COUNTY**

The Gold Hill "pocket," 2 miles northeast of Gold Hill, is near the top of the hill of that name in the S. W. $\frac{1}{4}$ N. E. $\frac{1}{4}$ Sec. 14, T. 36 S., R. 3 W., at an elevation of about 2000 feet. According to E. W. Liljegren, of Medford:

It was discovered in 1857 on top of the mountain about 2 miles east from the town of Gold Hill. The outcropping rock was so full of gold that it could scarcely be broken by sledging. The crystallized quartz associated with the gold was not honeycombed as it generally is where sulphides have leached out of the rock, leaving sprays of gold in the cavity. The gold in this pocket went down only 15 feet and occurred in a fissure vein, strike about S. 20° E.; dip about 80° E.; with a gash vein cutting the fissure nearly due east and west and dipping vertically. The fissure vein averages fully 5 feet between walls with 1 to 2 feet of gouge on the foot wall, which contains some calcite and quartz mixed with a little sulphide of iron, in spots containing free gold. A mass of micaless granite, about 5 feet wide by possibly 200 feet long, outcrops in the footwall side of the fissure. The country rock is pyroxenite. It is said that this pocket produced at least \$700,000.

GOLD HILL QUARTZ MINING COMPANY (gold) GOLD HILL DIST. JACKSON CO.

Office: Medford, Oregon. C. R. Ray, Pres.-Treas.; E. W. Liljegren, Sec., both of Medford. Capital stock, \$60,000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company's holdings comprise the E. $\frac{1}{2}$ of W. $\frac{1}{2}$ of N. W. $\frac{1}{4}$ Sec. 14, T. 36 S., R. 3 W., 2 miles southeast of Gold Hill. \$500 in improvement in 1915.

GOLD NOTE MINE (gold-copper)**GREENBACK DISTRICT****JACKSON COUNTY**

This mine is located on the Baker creek branch of Grave creek, 17 miles from the railway station at Leland and 9 miles east of Placer. It is owned by E. B. Crouch, of Grants Pass, and associates.

Some 300 feet of development work has been done, exposing oxidized and sulphide ores, which it is claimed run between 4 and 5 per cent copper, with some gold values. It is proposed to treat some of these ores by leaching processes.

GOLD RIDGE MINE**WEATHERBY DISTRICT****BAKER COUNTY**

This mine is situated 4 miles south of Durkee, about in Sec. 9, T. 12 S., R. 43 E. It is an old discovery that has been operated at times for many years, but is now idle, full of water and with adits caved. The total production is said to be \$210,000, practically all extracted from 1881 to 1886.

The country rock has a medium grained texture and undoubtedly belongs to the granodiorite clan, but owing to the fact that probably not more than 10 per cent quartz is present, it might better be called a quartz diorite.

According to Lindgren, there are three principal veins, two of them having a strike of N. 51° W. and dipping 65° S. W. A third strikes more nearly east-west and dips south. The veins cross the ridge about 200 feet above the shaft, but their outcrops are inconspicuous and for the most part concealed by wash. The ore above the tunnel had a value of \$12-\$15 per ton, the largest part of it free-milling.

GOLD RIDGE MINE (gold)**GOLD HILL DISTRICT****JACKSON COUNTY**

The Gold Ridge mine, 4 miles south of Gold Hill, is in the N. E. $\frac{1}{4}$ Sec. 3, T. 37 S., R. 3 W., on the west slope of Kane creek valley, at an elevation of 2100 feet by barometer. Some oxidized ore has been taken from a 1 to

2-foot fissure, which varies in strike from about north to east in an arc concave to the southeast and dipping steeply northwest. The country rock is schistose and weathered. Nearer the mill an open cut has been made on a 12-inch quartz vein, which strikes N. 63° W. and dips 73° S. W.; the hanging wall is an andesitic rock; the footwall is siliceous and contains a little biotite. The mine is equipped with a 2-stamp mill, having a plate 2½ by 8 feet, run by a 7-horsepower gas engine.

GOLD RIDGE PROSPECTS (gold) ILLINOIS RIVER DISTRICT JOSEPHINE CO.

Concerning these prospects, Diller says:

Pecket Knoll and the divide between Mike and Days gulches, 5 to 7 miles northwest of Kerby, have long been noted for their pockets of free gold. Pocket Knoll is composed of serpentine with a greenstone contact near its western base. From this contact northwest on the divide, to the head of Hoover gulch and beyond, the ancient lavas and tuffs include much reddish and siliceous slates of sedimentary origin. The cherty masses, especially about the head of Hoover and Mike gulches, have recently been prospected. With a small hand outfit consisting of a Simplex rock crusher weighing 150 pounds and a 25-pound muller and plate for pulverizing, T. M. Anderson, of Kerby, is said to have taken much gold out of a number of rich pockets.

There are a number of claims, 4 or more, on the flat divide at the head of Hoover and Mike gulches. The divide is occupied by a belt of more or less cherty slates, about 100 feet in width and covered by a thick layer of rotten rock, bounded on both sides by greenstone with serpentine nearby to the northwest. The greenstone is in places granular, but mostly compact and in general contains much auriferous pyrite. The cherty belt and its quartz veins trend N. 20° E. and dip 50° SE. A tunnel is being run across the belt in the rotten rock to locate the richest portion. A shaft has been sunk 20 feet in this soft rock and gold has been panned from the oxidized material at the bottom. The little swale on the northwest has been sluiced with good returns, and if water were cheaply available it is possible that considerable pay ground could be found.

A short distance northeast of the tunnel mentioned above is the Beauty claim, on which a pocket recently opened is said to have yielded \$5000 or more of free gold in quartz. The country rock is compact greenstone lying east of the siliceous slates, and the narrow pay streak, about 10 feet in length and within 2 feet of the surface, runs northwest and southeast perpendicular to the general course of the formations.

GOLD STANDARD MINING COMPANY (gold) JACKSONVILLE DIST. JACKSON CO.

Local name, The Gold Standard mine.

Office: Ashland, Oregon. P. S. Casey, Cle Elum, Wash., Pres.-Treas.; F. G. McWilliams, Ashland, Sec. Capital stock, \$82,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company owns the Gold Standard mining claim and the Grass Valley mining claim, consisting of about 30 acres, in Sec. 25, T. 37 S., R. 3 W., 2½ miles west of Jacksonville. This property joins the Opp mine on the northwest and is supposed to be on an extension of the Opp vein.

GOPHER MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Gopher mine, 8 miles east of Hugo, is on the northeast side of Walker mountain, in the S. E. ¼ Sec. 8, T. 35 S., R. 5 W., at an elevation of 2300 feet, as measured by barometer. It is owned by Mr. Dean, of Oakland, Cal. The main level has about 600 feet of crosscuts and drifts, besides raises, winzes and stopes. The vein material is similar to that of the Baby mine and the country rock is also similar. Several veins run in various directions in gabbro. In some places stopes are 7 feet wide. A crushed fault zone strikes N. 20° E. near the breast. The mine has been idle for several years.

GRAND PRIZE HYDRAULIC MINES WALDO DISTRICT JOSEPHINE COUNTY

Office: Holland, Oregon. Thomas Wilson, Holland, Pres.; Sam H. Baker, Grants Pass, Sec.-Treas. Capital stock, \$100,000; par value 20 cents; \$17,127.00 subscribed, issued and paid up. (1916 report).

This company is involved in litigation. Its property, about 3 miles east of Holland, is idle.

GRAY EAGLE GROUP (copper) HOMESTEAD DISTRICT BAKER COUNTY

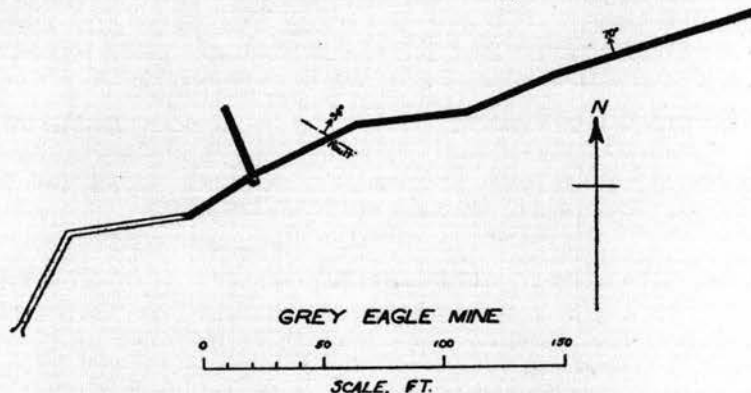
This property is owned by the Gray Eagle Development Company. It joins the Iron Dyke on the east and extends from that property nearly to the townsite of Homestead. It had several men employed in 1916 on the surface and underground and an electrically driven air compressor installed to furnish air for drills, so that a development of the property could more rapidly be prosecuted. Several tons of copper ore on the dump of the principal tunnel had been removed from the mine from ore encountered in crosscutting toward the Iron Dyke ledge, which is believed to continue through this property.

The owners are residents of Halfway, in Pine valley, a town about 20 miles southwest from Homestead.

GRAY EAGLE MINE (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Gray Eagle mine is in the S. E. $\frac{1}{4}$ Sec. 29, T. 35 S., R. 3 W., on the east side of Sardine creek, at an elevation of about 1850 feet above sea level, 6 miles northwest of Gold Hill.

The vein is opened by three adits on the hillside; the main adit is nearly 400 feet long, over 300 feet being on the vein, which is chiefly quartz and 9 to 12 feet thick. It strikes about N. 70° E. and dips 70° N. W. Beneath a fault, which strikes N. 60° W. and dips 34° N. E., but produces little offset, the vein is locally 35 feet in width; it is said to carry \$22 a ton in gold at this place, where a winze has been sunk 85 feet deep, and a raise extends to the



Gray Eagle, main adit. Vein in solid black

surface. The workings are shown in the figure. The vein is associated with an andesite dike in recrystallized quartzite. The Gray Eagle mine is now owned by Mr. Van Houten, of Gold Hill. It is equipped with an aerial tramway from the main adit to a 10-stamp mill on Sardine creek, which has a 30-horsepower and 10-horsepower gasoline engine, two amalgamating plates, each $4\frac{1}{2}$ by 10 feet, a rock crusher, and two concentrating tables. The mine has been idle since 1911.

GREAT NORTHERN MINE (gold) CANYON DISTRICT GRANT COUNTY

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. The country is greenstone (gabbro) and diabase-porphry. A quartz vein 1 to 2 feet thick, north and south strike, dipping 25 degrees west, is upon the property, but it is practically barren, although it contains pyrite and seams of calcite. Another vein on the property 2 feet wide strikes east and west and dips 35 degrees south. This is practically barren also. 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. 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 for other pockets with a few successes of much less importance than 1898.

A property of similar nature is the Dan O'Shea claim, in which rich pockets are found from time to time. It is owned by the same persons who possess the Great Northern mine. According to newspaper reports, the owner of these two properties is the Oregon-Utah Mining Company, but it is not known in this office to be a corporation.

GREAT NORTHERN MINE BLUE RIVER DISTRICT LINN COUNTY

This property of 6 claims is owned by L. B. Bartlett, of Portland, and is in the central part of T. 15 S., R. 4 E. The property is 50 miles from Eugene and 5 miles from Blue River, on the McKenzie river, from which it is reached by 4 miles of mountain road and 1 mile of trail.

The country rock is andesite. The lode is developed by several tunnels, raises, etc. An ore shoot is said to be stoped 10 feet wide and 75 feet long, averaging \$10 to \$12 per ton, with a maximum of \$15 per ton.

GREAT WESTERN MINING AND MILLING CO. BLUE RIVER DIST. LANE COUNTY

Office: 350½ Morrison St., Portland, Oregon. L. B. Bartlett, Portland, Pres.; Sarah Whiteside, Portland, Sec.-Treas. Capital stock, \$250,000; par value \$1.00; \$170,000 subscribed, issued and paid up. (1916 report).

The company owns 6 claims, 3 of which have been surveyed for patents.

GREAT WESTERN OIL COMPANY MALHEUR COUNTY

Office: Vale, Oregon. Frank Barrett, Pres.; H. P. Osborn, Sec.; T. W. Davidson, Treas., all of Vale, Oregon. Capital stock, \$1,000,000; par value \$1.00; all subscribed, issued and paid up. (1913 report).

Dissolved by proclamation in January, 1917.

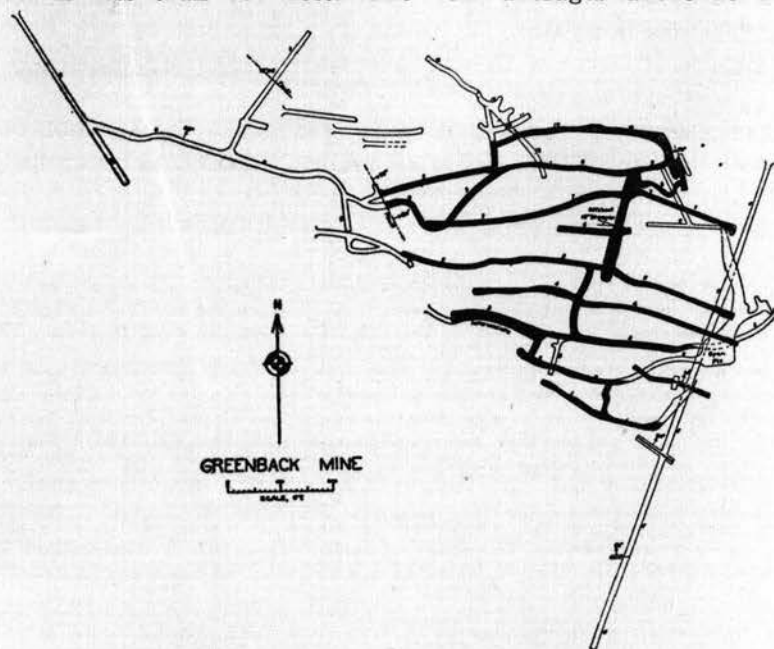
GREENBACK MINE (gold) GREENBACK DISTRICT JOSEPHINE COUNTY

The Greenback mine is situated near the head of Tom East creek, a tributary of Grave creek, about 1½ miles north of the town of Placer, which is 8 miles from Leland, the nearest railway point, in Sec. 33, T. 33 S., R. 5 W. Its presence has probably had much to do with making Tom East creek the site of one of the most important placer mines in Oregon.

The mine was discovered in 1897 and yielded rich returns from the first. In 1898 it was a producer of some importance, although at that time its ores were treated in an arrastre at Placer. The mine was then sold to the Victor Junior Gold Mining Company, from which it passed in 1902 to the Greenback Gold Mining and Milling Company. It is now owned largely or wholly by R. C. Robinson, of Parish, N. Y. It has the largest milling equipment in southern Oregon, consisting of 40 stamps, operated first by steam and later by electric power, and the following additional machinery: one 12 by 14 air compressor, 3 large Risdon crushers, 8 amalgamating plates each 12 feet long (now removed), 5 Frue vanners and 7 other concentrating tables, several Pelton wheels, 4 cyanide tanks each 4½ by 30 feet, besides solution and sump tanks, and an aerial tramway about 7000 feet long.

The mine is opened on 12 levels, as shown in the accompanying plan. Above the 9th level most of the ore is stoped out to the surface. Below that level it is opened only by a winze, which is full of water, and these lower workings shown in the drawing are taken from a map at the mine. The vein strikes about east and west and varies in dip from about 30 to 60° N. The average

dip from the 1st level to the 9th is about 45° N.; it is less above the 5th level, and about 55 to 60° below that level. The vertical depth reached by the 9th level is less than 500 feet. The vein averages about 20 inches in



Greenback mine, workings and ore body; workings on ore in solid black

width, but varies from less than 6 inches to more than 4 feet. The vein filling consists of quartz, calcite and pyrite, with quartz dominant in most places. The average content of the ore mined from the first and second levels was more than \$8 per ton, and 75 per cent of this ore was free-milling, according to Captain Buck. The concentrates ran about \$75 a ton, and after cyaniding the waste product contained less than \$1 to the ton.

The country rock at the Greenback mine is largely greenstone, which is the result of alteration of an andesitic mass. Southeast of the mine serpentine is abundant, while an area of argillite lies to the north. The vein is cut off to the eastward by serpentine, which is apparently later than the mineralization, since the latter is not known to extend into the serpentine, either with or without faulting at the contact. To the westward the main vein is cut off by an important fault which strikes N. $35-40^{\circ}$ W. and dips $75-80^{\circ}$ N. E. Between these 2 limits, which are about 600 feet apart on the 9th level, the vein is continuous, although exhibiting variations in both strike and dip. Outside of these limits it has nowhere been found. In the stopes on the 6th level there is some indication of a branch vein or stringer going downward into the footwall and diverging also on the strike to the westward, but it has not been explored.

About 80 feet south of the Greenback vein on the 5th level the Irish Girl vein strikes N. 70° W., almost exactly parallel with the former, and dips about 60° N. Where opened it is a vein similar to the Greenback in mineral contents, but only 1 to 3 feet thick and lower in grade. It has been opened only by a drift 75 feet long and a short raise. The long crosscut into the footwall discloses two more veins, which are about parallel, but they are still smaller.

The Greenback mine is at present under lease and bond to Dr. W. L. Baker, of Buffalo, New York, and H. L. Holmes, of Geneva, New York, who

are prosecuting some systematic work of rejuvenation of the property, under the efficient management of Mr. Childers, of Montana. They are at present working a force of 30 men.

GREENBACK MINES COMPANY

Filed articles of incorporation in September, 1915. Incorporators, W. S. Farmer, A. C. Hough and Jessie Martin. Capital stock, \$2,000,000.

GREEN MINE (placer) JACKSONVILLE DISTRICT JACKSON COUNTY

The Green mine, on Forest creek, adjoining the Sturgis mine on the north, is owned by C. W. Green, of Jacksonville.

GREEN MOUNTAIN COPPER PROSPECT GREEN MOUNTAIN DIST. DOUGLAS CO.

Diller says:

Northeast of Galice the Green Mountain Copper Company has recently opened up a suggestive mass of pyritic ore at an elevation of 3,900 feet on the northwest slope of Green Mountain, 15 miles east of Glendale and about a mile from the country road. The company controls 330 acres of land, part of which is patented.

The country rock is typical greenstone that has been greatly sheared and altered but still preserves its original structure and composition sufficiently to show its diabasic character. The greenstone belt, nearly a mile wide over the summit of Green Mountain, lies between belts of slates and other sedimentary rocks, and is cut off a short distance to the south by serpentine, whose intrusion has influenced the mineralization of the region. The ore impregnates the greenstone and forms lenses. It is usually incased in deep-green chloritic material.

The important copper mineral is chalcopyrite, which is intermingled with a large proportion of pyrrhotite and pyrite. The range of color from bronze to brass-yellow suggests the presence of cubanite, but the ore tested that was free from chalcopyrite gave no trace of copper.

The outcrop lies in the upper drainage of Starveout creek, whose placers have been remarkably productive. At the time of my visit (Sept. 6, 1911) the irregular incline, about 40 feet in length, exposed a body of ore $2\frac{1}{2}$ to 3 feet in thickness, where it disappears beneath the incline. A tunnel is now being run in the hope of finding this ore body at a depth of 200 feet below its outcrop in the incline. The tunnel is already 40 feet in and several hundred feet have yet to be driven. The Pacific Outlook, Dec. 28, 1911, reported that the tunnel was in 140 feet and that a 2-stamp mill had just been completed.

The Green Mountain Copper Company was dissolved by proclamation in January, 1917.

GREEN ROCK MINING COMPANY BOHEMIA DISTRICT LANE COUNTY

Not incorporated. Office: Seattle, Wash. James Miller, Sec.-Treas. Owned by the Miller Bros.

Property is located in T. 23 S., R. 2 E., about 4 miles east of the Champion mine, which is 12 miles southeast of Disston, the terminus of the 20-mile branch railroad from Cottage Grove.

During the summer season of 1916 this company was employing 6 or 7 men, operating a small compressor and a Chilian mill.

GREY EAGLE MINE (copper) WALDO DISTRICT CALIFORNIA

The Grey Eagle mine, a few miles over the line in California, is said to be a very excellent copper property. A third interest in the mine was recently sold to W. P. Thompson, of New York, by John B. Farrish, Fred Dakin, Sr., and Fred Dakin, Jr., on a basis of \$500,000. This interest has since been turned over to the Mason Valley Mines Company of Nevada. This company intends to build a railroad to the mine from Waldo, and connect with the California-Oregon Coast Railway Company's line at that point.

GRIFFITH MINE (placer) GRANITE DISTRICT GRANT COUNTY

These placers are in Sec. 16, T. 9 S., R. 36 E.

The Griffith placers are in a high terrace about $3\frac{1}{2}$ miles northwest of the Weaver mine, at an elevation of approximately 5,500 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° N.E.

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 1½ ounces per ton. (The present market value of refined platinum is \$29 per ounce—in 1914 about \$40 per ounce.) 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 serpentinized 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.

GRIZZLY MOUNTAIN MINING & REDUCTION CO. (gold-silver)

BOHEMIA DIST.

LANE COUNTY

Office: Cottage Grove, Oregon. J. C. Klopffinstein, Pres.; George W. McQueen, Sec., both of Cottage Grove. Capital stock, \$1,000,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

Property consists of 5 claims located about one-half mile northwest of Grizzly mountain in Sec. 11, T. 23 S., R. 1 E., 1½ miles northeast of Bohemia postoffice, which is about 15 miles southeast of Disston, the terminus of a 20-mile branch railroad from Cottage Grove. Reported to have an ore body on a porphyry dike 20 feet wide, the vein showing good walls, with 1 foot of high grade ore on the footwall. Minerals are lead and copper sulphides with gold and silver values.

GRUBSTAKE MINE (gold)

UPPER APPLGATE DISTRICT

JACKSON COUNTY

This mine is 35 miles south from Jacksonville, in Secs. 9 and 16, T. 41 S., R. 2 W., on the Elliott creek branch of the Applegate. Mr. F. W. Carnahan, of Medford; Frank Edwards, of Watkins, and Walter Garrison, of Myrtle Creek, are the owners.

Three hundred feet of tunnels have been driven on the property, more than 200 of which is a drift on a good-looking quartz vein. The property is equipped with an arrastre, a 32-foot overshot wheel and a small cyanide plant. The mine was in operation in 1916.

GUERIN CLAIM (placer)

SIXES RIVER DISTRICT

CURRY COUNTY

The only information obtainable concerning this deposit are the statements of Diller that at the time of his investigation "the Guerin brothers were ground sluicing just above the mouth of Butcher gulch, in Sec. 21, T. 32 S., R. 13 W. From one of the Guerin brothers, who works a placer along the South fork of the Sixes, the writer obtained about 5 ounces of concentrates to examine for platinum. Nearly 85 per cent of the concentrates were magnetite, and the remainder was chiefly ilmenite or chromite. Numerous scales of gold were present, but no platinum or iridosmine was found."

HADLEY CLAIMS

SIXES RIVER DISTRICT

CURRY COUNTY

See "Wallace and Hadley" claims.

HAGELSON PROSPECT

BAKER DISTRICT

BAKER COUNTY

In the S. W. ¼ of Sec. 22, T. 9 S., R. 39 E., on the northwest side of Washington gulch, are a number of prospect holes and tunnels on veins said to

have been located by the "forked-stick method." The country rock is greenstone cut by some diorite dikes. One of the veins is composed largely of platy calcite.

HAMILTON MINING COMPANY**IDAHO**

Office: 307 Benton St., Portland, Oregon. R. E. White, Portland, Pres.; A. N. Hamilton, Milwaukie, Oregon, Sec. Capital stock, \$2400; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company's properties are located on the South fork of Salmon river, Idaho county, Idaho.

HAMMERSLEY MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

For description see "Daisy Mine."

HAMMERSLEY MINE (chrome) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Hammersley mine, near the Lucky Queen mine, on Shorthorn creek, is a good-looking chrome prospect.

HAMM GOLD MINING COMPANY (placer)**BAKER COUNTY**

Local names, Big Creek Placers, Cow Creek Placers.

Office: Hereford, Oregon. A. B. Hamm, Pres., Ramer, Tenn; A. M. Howell, Sec.-Treas., Kenton, Tenn. Capital stock, \$100,000; par value \$1.00; \$83,140 subscribed, issued and \$83,135 paid up. (1916 report).

About 3 miles east of Hereford, in Sec. 8, T. 12 S., R. 39 E., on Big creek and Cow creek, a branch of Big creek, the latter a tributary of Burnt river, from the north. Elevation about 4000 feet. Wagon road to Baker via Bridgeport postoffice, Auburn creek and Stices gulch. Elevation of pass, 5200. Placers in sagebrush-covered hills near timber line. Lands are Big Creek placer and B. C. O. placer. These placers are located upon andesitic and basaltic lava bedrock; the gold-bearing gravels upon these rocks are from the erosion of the older argillites and intrusive granodiorites, which are found outcropping in somewhat limited areas in the upper drainage of these creeks.

The annual labor performed is about \$1000 and production is reported below \$1000.

HAMPSON'S CLAIMS**GOLD HILL****JACKSON COUNTY**

See "McLemore & Hampson's" claims.

HANNIBAL MINING & MILLING COMPANY (gold) WEATHERBY DIST. BAKER CO.

Local name, Big Lode mine.

Office: Baker, Oregon. J. H. Waugh, Pres.; G. S. Misener, Treas., both of Vancouver, B. C.; M. N. Thompson, Sec., Baker, Oregon. Capital stock, \$96,000; par value \$1.00; subscribed, \$96,000; none issued or paid up. (1913 report).

Located 2 miles northeast of Weatherby, a station on O.-W. R. & N. Co. line, on Chicken creek, a tributary of Burnt river. Lands, 4 quartz claims. Have not been visited, but secretary reported in 1914 that about \$20,000 had been expended upon the property. He describes the recent work as "a crosscut tunnel 600 feet tapping the contact, at a depth of 200 feet from surface. We are driving on the contact and it is proving to be a very large body of ore and mineral matter. In this body we find several different ores, some having tested from \$3 as high as \$40 in gold." In 1915 and 1916 assessment work is about all that has been done.

Dissolved by proclamation in January, 1917.

HANSEN COAL MINE**JACKSONVILLE DISTRICT****JACKSON COUNTY**

The Hansen coal mine is less than 1 mile north of the Cascade and at an elevation of 1650 feet, as measured by aneroid barometer. The entry is irreg-

ular and shows only a little coal; 130 paces from the portal a 2-inch seam of coal strikes N. 30° W. and dips 20° N. E. At 140 paces from the portal a raise to the surface exposed the following section:

Section at Hansen Coal Mine		
	Feet	Inches
Surface.		
Shale	30	
Clay		1-3
Coaly shale		1
Coal, with thin shaly partings.....		12
Carbonaceous shale		2
Coal		1½
Carbonaceous shale		2½
Coal		1
Coaly shale		3
Coal		½
Carbonaceous shale with thin seams of coal..		18
Covered.		

The coal here strikes N. 40° W., and dips 10° N. E.

HARRISON CLAIMS (gold) SIXES RIVER DISTRICT CURRY COUNTY

In Sec. 23, T. 32 S., R. 13 W. on southern slopes of Rusty butte in slaty rock and greenstone. Small irregular veins carrying gold in pyrite, arsenopyrite and galena. Claims are St. Patrick's, Golden Fleece and Mountain Daisy, which may not all belong to Harrison group. Oxidized portion of veins have fine gold and some wire gold.

HARTH AND RYAN MINE GOLD HILL DISTRICT JACKSON COUNTY

The Harth and Ryan mine is in Sec. 33, about 3 miles south of Woodville, at elevations of 2350 to 2600 feet by barometer. It is opened by 4 adits, having a total length of 500 feet, at different elevations on a steep mountain side. The lowest adit discloses 2 crushed zones which strike west and dip toward each other at angles of about 70°; they contain very little quartz. The next adit is the main entry; it extends south and then southeast for 300 feet; about 100 feet from the portal a vein strikes N. 22° E. and dips 45° S. E. At the end of a branch to the southwest a raise discloses a vein striking N. 10° W. and dipping 80° N.; probably the same vein is found at the face of the uppermost adit where it contains 6 to 12 inches of quartz. The country rock at this mine is a "greenstone" containing patches and irregular bands of varying composition, some being chiefly fine granular quartz, others plagioclase, and others hornblende with a few pseudocrysts of the latter mineral.

HASKINS & TRAVERSO CLAIM UPPER APPLIGATE DIST. JACKSON COUNTY

Haskins and Traverso have a prospect in the N. W. ¼ Sec. 6, T. 41 S., R. 2 W. on the north side of Squaw creek at an elevation of 3450 feet by barometer. It is opened by 2 short adits and a 20-foot shaft. The vein is 1 to 3 feet thick, striking N. 71° W. and dipping 60° N. E. in old andesite. The quartz near the surface shows a little copper stain.

HEAVERNE GROUP (copper) WALLOWA DISTRICT WALLOWA COUNTY

These claims are located in Sec. 31, T. 4 S., R. 45 E. on the west fork of the Wallowa river about 13 miles south from Joseph, the railroad terminus from which it is reached by wagon road for 5 miles and indifferent trail for 8 miles. It is about 1½ miles below the Fraser property, and to the east of and near the stream in a limestone-granodiorite contact. The limestone here has approximately an east-west strike, with a high angle of dip to the north. The contact appears to be somewhat irregular and of less width than at the Fraser mine, but considerable epidote and chalcopyrite are visible in the small amount of surface work accomplished. The lesser

amount of contact-metamorphism may be due to a steeper angle of dip than found at Frasers.

HECLA CONSOLIDATED MINING COMPANY (lead, zinc, gold and silver)
WALLOWA DISTRICT **WALLOWA COUNTY**

Local name, Gyllenberg claims (?).

Office: Baker, Oregon. John L. Rand, Pres.; M. Ethel Brooks, Sec.-Treas., both of Baker, Oregon. Capital stock, \$1,000,000; par value \$1; all subscribed, issued and paid up. (1915 report).

Owens 11 claims in about Sec. 21, T. 3 S., R. 44 E. on the west side of Hurricane creek, about 9 miles from Joseph.

Some 1500 to 2500 feet above and west of the Hurricane trail, and a mile or so beyond the mouth of Fall creek, is a considerable area of banded blue-gray crystalline limestone. Above this limestone is a large exposure of schist which apparently is conformable with the limestone. This high amphibolite basin built of marble, and walled in by ancient volcanics from pit to gallery, is swept almost clean of loosened stone.

Both limestone and superimposed schists have been cut by numerous dikes. Some of these are light in color, showing in the ground-mass but few crystals of quartz and feldspar. These quartz porphyry dikes since they have neither mica nor hornblende approach aplite in character. In contrast to these acidic dikes are the more interesting lamprophyres. This rock occurs in slightly lens-like dikes parallel to the schistosity of the limestone.

In texture they are very fine-grained, almost dense. These dikes contain about 5 per cent of pyrite, and in thin sections are found to be a lamprophyre, variety kersantite.

Basalt dikes in this region are the youngest dikes of all. A double dike of basalt is well shown. The ore, which is chiefly galena and sphalerite, with a little pyrite, occurs in small lenticular-shaped bodies, less than a foot wide and only a few feet long. The long axes of these lenses are parallel to the schistosity or banding noted above. On each side the limestone is recrystallized and nearly white in color. A little cerussite, lead carbonate, colored green by copper stains, was seen.

HELL GATE MINING AND DEVELOPMENT COMPANY (placer)
GALICE DISTRICT **JOSEPHINE COUNTY**

The Hell Gate Mining and Development Company (dissolved January 3, 1912,) has done considerable work on a deposit of gravel on the southwest side of Rogue river near the mouth of Hog creek at a level high above the present stream. The resultant excavations are in plain view from the county road across the river. No activity for several years.

HEMLER (GEORGE E.) CLAIMS (gold) **CRACKER CREEK DIST. BAKER COUNTY**

These 5 claims are about 2 miles north of the Columbia mine on Fruit creek at an elevation of about 7500 feet.

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

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

The country rock is granodiorite and argillite with vein cutting both. It has a porphyry dike in with the vein and good gouge on foot wall of vein. The widths above given include the dike. The ore is from 3½ to 4 feet wide. Values are from \$4 up, but the general average is about \$10 per ton. There is plenty of water and timber, a good wagon road to the property and the

power line of Eastern Oregon Light and Power Company is only 1 mile away. The above information is from the owner.

HENRYVILLE MINE (coal) COOS BAY DISTRICT COOS COUNTY

Local name, Smith & Powers mine.

Located about $\frac{1}{2}$ mile west of Henryville and about 6 miles southeast of Marshfield. Owned by the Coos Bay Coal and Fuel Company. The mine has been recently leased by R. M. Jennings and associates, of Portland.

The coal beds have a total thickness of about 5 feet, having 2 partings; the lower parting about 2 feet from the bottom some 6 inches thick, and the upper parting about 8 inches from the roof, leaving the lower and middle seams about 2 feet and 30 inches thick, respectively. The beds dip to the east at varying angles, the upper part of the incline shaft being about 28°, while at the lower part of the incline, 1200 feet down, it is sometimes less than 20°.

The surface equipment of the mine can no doubt be improved with profit as nearly 50 per cent of the product, according to the statement of the former manager, goes into slack and is therefore thrown on the waste dump.

The mine is equipped with a 200 H. P. electric hoist, a Sullivan exhaust fan, electrically driven, 6 feet in diameter and 30 inches wide, making about 200 revolutions per minute.

The mine has a capacity at present of about 100 tons per day.

HEPPNER MINING COMPANY (gold) NEW ELDORADO DISTRICT GRANT COUNTY

Local name, Heppner mine.

Office: Heppner, Oregon. D. B. Stalter, Pres., Austin, Oregon; J. O. Hager, Sec.; S. A. Wright, Treas., both of Heppner, Oregon. Capital stock, \$1,000,000; par value 10 cents; \$97,458.80 capital stock subscribed, issued and paid up. (1916 report).

This company owns 13 claims on the southern slope of Greenhorn range about 6 miles from the Austin-Susanville road and about 18 miles from Austin, the shipping point.

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° 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.

HERRIMAN PROSPECT BAKER DISTRICT BAKER COUNTY

See "Baker and Herriman Prospect."

HICKS CLAIM GOLD HILL DISTRICT JACKSON COUNTY

See "Big Buck Claim."

HIDDEN TREASURE GOLD MINING COMPANY (gold) GREENHORN DIST. GRANT CO.

Local name, I. X. L. mine.

Office: Baker, Oregon. Fred T. Kelly, Pres.; N. M. Kelly, Sec. 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. 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.

HIDDEN TREASURE MINING COMPANY (placer) WALDO DIST. JOSEPHINE CO.

Office: 417 Corbett Bldg., Portland, Oregon. George P. Lent, Pres.; Chas. A. Goulding, Sec.; T. M. Wilson, Treas., all of Portland, Oregon. Capital stock, \$250,000; par value \$1.00; all subscribed, \$180,000 issued and all paid up. (1916 report).

This company is involved in litigation. Its property, 3 miles east of Holland, Oregon, is idle.

HIGGINS MINE (gold) CHINA DIGGINGS DISTRICT CUREY COUNTY

This property was not visited, but Diller describes it as follows:

The Higgins mine, at the head of Slide creek on the Chetco side of the divide, 12 miles on a direct line or 20 miles by trail nearly west of Kerby, has recently attracted much attention. The holdings embrace 10 claims taken up, at least in part, by L. G. Higgins in 1903. They extend northeast and southwest along a contact of greenstone and serpentine. The contact has been sluiced at a number of places and most of the gold has been won in this way. The gold is very fine and flaky. It has not been transported, but was set free by decomposition of the rocks in place along the contact. The gold does not occur in quartz veins, according to Mr. Higgins, but between the folia of the talcose minerals in the shear zone along the contact.

The latest strike of this mine is in the "Golden Dream" at the head of Slide Creek, at an elevation of about 3,500 feet, and has been sluiced by lessees. The ore was rich but not richer than that obtained by Mr. Higgins years ago on the same contact, three-quarters of a mile further southwest. Mr. Higgins has erected a three-stamp mill with a concentrator to mill the contact rock. A 100 foot tunnel, somewhat meandering, has been run along the sheared contact to open it up, but there is no evidence to show the relative value of the rock at and beneath the surface. A short distance west of the mine some slaty rocks outcrop which may be of sedimentary origin, but no gold is reported along this border.

The Higgins mine affords one of the best examples of the general character of the pockety lode-gold deposits in southwestern Oregon.

HIGH GRAVEL MINE (placer) WALDO DISTRICT JOSEPHINE COUNTY

The High Gravel, or Osgood mine, is owned by F. H. Osgood, of Seattle, Washington, and is in Secs. 33 and 34, T. 40 S., R. 8 W., a little less than a mile south of Waldo.

The principal workings are at the head of Allen gulch on both sides of the divide between the east and west forks of Illinois river. Most of the material mined is the conglomerate, determined to be of Cretaceous age by Diller, which forms the bedrock of the other placer mines in the region; it occurs here as a small remnant of a formation once much more widespread. On the west slope the deposits mined extend for about an eighth of a mile along the ridge with an average width of about 100 feet. A strip less than 100 feet wide separates the cuts on the two sides of the hill. In the cut on the east side of the ridge a maximum thickness of about 60 feet is exposed. Mining has been discontinued here. There has been some mining of the recent gravels all along Allen gulch. According to Kay, the conglomerates

are not strongly cemented and the boulders are rather uniformly distributed throughout the section. Distinct joints are present in the conglomerates and a few small veinlets occur. The bed rock is a fractured, fissured, decomposed, and veined greenstone, which, owing to the presence of iron oxides, has a decidedly purplish tint. These Cretaceous conglomerates are shore deposits, derived from older rocks, similar to those on which they now lie. As stringers carrying values are fairly widespread in these old rocks, some gold is probably present in much of the conglomerate which has been derived from them. But whether or not these values are sufficiently concentrated, as at the High Gravel mine, to be profitably mined can be determined only by prospecting.

HIGHLAND CLAIM**GOLD HILL DISTRICT****JACKSON COUNTY**

The Highland claim, 12 miles southwest of Gold Hill, is in the S. W. $\frac{1}{4}$ Sec. 22, T. 37 S., R. 4 W., on the right fork of Foothills creek, at an elevation of 2600 feet by barometer. It was worked about 20 years ago by Fuller and Bayington; it is now owned by Cook and Swacker. The present workings are confined to the oxidized zone; the old workings were more extensive. The ledge is said to strike N. E. and dip about 35° S. E.; the country rock is a micaceous sandstone.

HIGHLAND DEVELOPMENT COMPANY**ROCK CREEK DIST.****BAKER COUNTY**

Office: Baker, Oregon. S. O. Correll, Pres.; R. R. McGaughey, Sec. Capital stock, \$50,000; par value \$1.00; \$48,948 subscribed, issued and paid up. (1914 report). Dissolved by proclamation in January, 1917.

This company was organized to lease the "Highland Mine" from the Highland Gold Mines Company. Fifty thousand dollars was too low a capitalization for equipping and operating purposes only, without having to meet the payments agreed upon in the lease. When production began the development company was in debt. The receipts from the production were little more than enough to meet operating expenses, but these funds were continually drawn upon to pay old bills of the development company and to meet payments on the bonds of the old company (one of the conditions of the lease), which resulted in continued shortage of funds to meet payrolls and, consequently, the efficiency of labor was low. The management failed to impound tailing from the mill as requested, and finally an injunction was granted by the courts against the company enjoining it from polluting Rock creek and consequently the irrigating ditches drawn therefrom. The mill closed down and liens of creditors both of labor and materials were filed. To determine whether the liens held priority over a mortgage, an action was begun in the courts, which was decided by the Supreme Court in December, 1915, in favor of the liens.

The result of this decision was that the Highland mine soon legally became the property of the creditors, with D. W. French, of Baker, Oregon, as trustee, and the assets of both the Highland Gold Mines Company and the Highland Development Company were extinguished. The mine is reported to have been sold under bond and lease late in August, 1916, to Delbert E. Metzger by the creditors.

For description of property, see "Highland Mine."

HIGHLAND MINE (gold-silver)**ROCK CREEK DISTRICT****BAKER COUNTY**

This mine, which was owned by the Highland Gold Mines Company and operated by the Highland Development Company, is now owned by creditors, who secured the property through labor and material liens. It was leased by them to Delbert E. Metzger in 1916.

The mine buildings and mill are situated in the lower end of Maxwell basin, a mile above the junction of the gulch with Rock creek, in Sec. 19, T. 8 S., R. 38 E. It is reached by wagon road from Haines, the shipping point, a distance of 14 miles and a rise in elevation of 2500 feet.

The property contains 6 claims, the oldest of which was located in 1891. Ore was first discovered in a tunnel near the bottom of the gulch, and though most of the early work was done south of it, the important work which began in 1909 has been confined to tunnels on the north side. A small mill was erected in 1905, but this was replaced by a modern 50-ton plant in 1911, which was run continuously until April, 1914. The immediate cause of the cessation of work is reported to be an injunction issued by a local court restraining the operating company from polluting the waters of Rock creek.

The following statement of production is submitted by the company:

1905	\$ 7,781.67a
1909, 330 tons crude ore.....	25,527.06b
1910, 960 tons crude ore.....	43,826.00b
1911, 186 tons crude ore.....	11,129.28b
1912, 1,725 tons concentrates.....	84,014.50b
1913, 2,678 tons concentrates.....	111,472.39b
1914, to April 15th, 443.62 tons concentrates..	27,801.78b

\$311,552.68

a. probably net. b. gross.

The mine is developed by 6 tunnels with an aggregate length of about 5000 feet. Two tunnels lie south and 3 north of the gulch line. The sixth is a crosscut 625 feet to the vein, with extensive drifts northeast and southwest. These tunnels explore a well defined vein at several levels over a total distance of 3500 feet. In September, 1914, 3 were accessible in part; No. 2 on the north side of the gulch for a distance of 1150 feet, and No. 4 (Highland crosscut or mill level) 240 feet lower, for 1000 feet along the vein.

The Highland vein is the most persistent of the group comprising the Highland, Maxwell, Baisley-Elkhorn and other associated veins. Beginning at the southwest with the Highland vein, which strikes N. 75° E., the Maxwell and Baisley-Elkhorn are successively offset to the east, and the northernmost or Baisley-Elkhorn strikes N. 40° E. Broadly, the dip of each is nearly vertical, though from place to place the stopes show deviations of a few degrees either to the northwest or southeast. Minor fractures, locally ore-bearing, occur nearly parallel to each of the three main veins. At the southwest limit of exploration, the Highland vein, wholly in dense argillite, is about 500 feet from the main granodiorite contact, but farther northeast this distance decreases and the veins successively approach and finally enter the granodiorite. The Baisley-Elkhorn is largely within this rock.

The Highland No. 4 crosscut tunnel starts in a dense gray siliceous argillite which strikes east and dips 60° to the south. This rock contains zones of irregular narrow quartz-filled fractures and is succeeded by a darker argillite, with a few fractures and no quartz veinlets. The rocks forming the walls of the vein range from dark dense carbonaceous argillites to light, coarser siliceous varieties and bedding is rarely determinable near the vein. The character of the vein, as well as the deep narrow furrows on the south wall, inclined at low angles to the northeast, indicate that the vein follows a fault, along which appreciable movement has taken place. The vein material is bounded by well defined walls, from which it breaks freely. Crosscuts locally show a width of as much as 28 feet between the walls, but the more productive portion in few places exceeds 30 inches in width.

The zone of oxidation is very shallow and irregular, probably because the explored portion of the vein crops out within a glaciated area. Films of recently formed hydrous oxide of manganese occur along the walls at a number of places on the lowest drifts.

Four shoots of ore have been found, and though three are fairly defined, the fourth, which has been the source of the richest ore, has been stoped over a very irregular area, and no exact record of its extent has been kept. The most southwestern, or Big Silver shoot, is reported to be 300 feet long, but to contain material of low grade, only a small portion of which was stoped. The next, or Shelton shoot, is 60 feet long and was the source of some ore of shipping grade in the early history of operations. The main shoot, the source of most of the recent production, extends from a shaft near the bottom of the gulch about 1100 feet northeast.

As the shoot has been explored to a depth of only 360 feet, its attitude in

the vein is not known with assurance. The Beckwith shoot, 180 feet long, lies farther northeast and the greatest stope length is about 120 feet.

The vein contains several distinct classes of material, each of which locally has been found by assay to warrant mining, though places are known where each contains but little gold and silver, a condition that requires numerous assays, both during development and actual mining, in order that the grade of the product may be maintained. The richest ore shows bunches or short lenses of sulphide minerals in white quartz, locally showing radial structure. The sulphides noted, in order of importance, are fine granular pyrite in which are small patches of dark blende and coarsely crystalline galena, arsenopyrite, chalcopyrite and tetrahedrite. Locally there are small patches of a greenish mica that may be either sericite or fuchsite. This pyritic material here and there is coherent and has definite structure, but most of it is not coherent and a definite structure cannot be recognized in hand specimens. Tests have shown that some of the more coherent material is merely a breccia of the ore minerals cemented by calcium carbonate, and that some of the quartzose portion is a similar quartz breccia. This is one of several features showing that considerable post-mineral movement has taken place in the vein. It is reported that this material from the eastern part of the main shoot contains as much as 2.5 ounces of gold and 15.0 ounces silver per ton, but that very similar material farther west is considerably lower in grade.

Another class of filling is found in the Big Silver shoot and the western portion of the main shoot. Here angular fragments of argillite or masses of pale green mica and pyrite that resemble replaced argillite are embedded in quartz, locally having radial structure. Such material is undoubtedly an argillite breccia more or less replaced by vein minerals and cemented by quartz. This is reported to be low grade.

By far the greater portion of the vein filling is an incoherent mass of crushed argillite, clay, quartz and ore minerals. The argillite is locally fresh but dominantly silicified, and the clay, which ranges in color from light gray to nearly black, appears to have been formed by the alteration as well as attrition of the argillite country rock. The darker varieties of such clays are uniformly low grade, but otherwise the content in gold and silver varies greatly. It is necessary to mine large quantities of this material in order that the richer portions of the vein may be found, as well as to avoid the necessity of holding it in place in the stopes.

With the exception of the quartz-argillite breccia, which usually forms well defined lenses, the other two materials form both definite zones and highly irregular masses, but in each case the limits are walls or slips, along which the materials separate freely.

The ratio of silver to gold in the ore ranges for the most part from 5 to 25 of silver to 1 of gold by weight, but in the concentrates the ratio deviates but little from 9 to 1, being approximately 15 ounces silver and 1.80 ounces gold to the ton. Concentrates containing galena show a higher proportion of gold than the normal pyritic concentrates and indicate an association of gold with that mineral. Thus, a concentrate containing 15.5 per cent lead yielded 5.28 ounces gold and 23.12 ounces silver to the ton. The average recovery from the ore in the present mill has been about 2 ounces silver and .25 ounces gold to the ton. The tailings are reported to contain gold and silver to the extent of \$1.80 to \$2.20 to the ton in value.

HIGHLAND SURPRISE CONSOLIDATED MINING CO. (Idaho corporation) IDAHO

Office: Kellogg, Idaho. W. W. Papesh, Pres.; W. B. Wadsworth, Sec.-Treas., both of Kellogg, Idaho; C. W. Butler, Independence, Oregon, attorney-in-fact. Capital stock, \$1,200,000; par value \$1.00; \$1,000,000 subscribed, \$852,100 issued and paid up. (1914 report).

HILL CLAIMS (copper)**HOMESTEAD DISTRICT****BAKER COUNTY**

South of the MacDougall group, in Secs. 1 and 2, T. 6 S., R. 48 E., are a number of claims on which there is a variety of rocks belonging to the greenstone series. One of them, although locally called "monzonite," undoubtedly is greenstone. Its exact original character was not determined. Although considerable development has been done in this rock, the more favorable parts of this group are those places where the conditions are similar to the MacDougall and Ballard claims, which see for descriptions.

HILLSBORO GOLD MINING COMPANY (placer) EAGLE CREEK DIST. BAKER CO.

Local name, Eagle Creek Junction placer mine.

Office: Hillsboro, Oregon. J. W. Shute, Pres.; A. C. Shute, Sec.-Treas. Capital stock, \$6000; par value \$1.00; all subscribed, issued and paid up. (1914 report).

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

HOLLENBECK CLAIMS**SIXES RIVER DISTRICT****CURRY COUNTY**

See "Byers & Hollenbeck Claims."

HOMESTAKE MINE (gold)**GOLD HILL DISTRICT****JACKSON COUNTY**

The Homestake mine is in the N. W. $\frac{1}{4}$ Sec. 16, T. 36 S., R. 4 W., about 1 mile northwest of Woodville, at an elevation of 1600 feet by barometer, and is owned by Dr. C. R. Ray, of Medford.

The main entry extends northeast about 300 feet and thence northwest about 200 feet, crossing numerous small quartz veins and stringers. The country rocks are impure quartzites and argillites. The upper adit strikes a well defined quartz vein about 12 to 18 inches thick, which strikes N. 35° W. and dips 35° N. E. Caved ground prevented learning how far the vein was followed. The mine is equipped with a 5-stamp mill having a concentrator and slime table. The ore contains pyrite and a little galena and sphalerite; telluride of gold is reported in it, but it was not observed.

HOMESTAKE MINE (gold)**SUSANVILLE DISTRICT****GRANT COUNTY**

The Homestake mine is on the northern side of Elk creek, a little farther up than the Badger mine. It has a N.-S. vein in serpentine, in which a shoot 4 feet wide and 300 feet long contains \$8 free gold near the surface. Zinc-iron sulphides are found but a short distance below the surface.

HOMESTEAD-IRON DYKES MINES COMPANY (New York corporation)**HOMESTEAD DISTRICT****BAKER COUNTY**

Office: 60 Broadway, New York City. David M. Goodrich, Pres.; Charles C. Goodrich, Sec.-Treas., both of New York City; N. D. Simon, 710 Board of Trade Bldg., Portland, Oregon, attorney-in-fact. Capital stock, 1000 shares; no par value; all subscribed, issued and paid up. (1916 report).

This company operates the property of the Iron Dyke Copper Company, which see.

HORSE SHOE PROPERTY**WALDO DISTRICT****JOSEPHINE COUNTY**

The Horse Shoe property is in the N. E. $\frac{1}{4}$ Sec. 17, T. 40 S., R. 7 W., 4 miles south from Holland. These workings were not examined. The size of the dump indicates several hundred feet of development.

HUMBOLDT CONSOLIDATED GOLD MINES MORMON BASIN DIST. MALHEUR CO.

Office: Baker, Oregon. Fred R. Mellis, Pres.; James A. Howard, Sec.; J. E. Goyer, Treas., all of Baker. Capital stock, \$1,200,000; par value \$1.00; \$1,000,000 subscribed, issued and paid up. (1916 report).

This company formerly owned the Humboldt mine in Mormon Basin, but lost it in 1916 through labor and material liens. The company is now without assets. For description, see Humboldt mine.

HUMBOLDT MINE**MORMON BASIN DISTRICT****MALHEUR COUNTY**

This mine, which was formerly owned and operated by the Humboldt Consolidated Gold Mines Company, is now owned by John Kiernan, of Portland, Oregon. The company lost the mine through labor and material liens. It is now idle and full of water. The pumps were pulled in March, 1916.

The mine is situated in the southwestern part of Mormon Basin, in Malheur county, in the N. W. $\frac{1}{4}$ of Sec. 20, T. 13 S., R. 42 E. It has 4 levels and was worked by means of a vertical shaft. There is a 20-stamp mill upon the property, which used amalgamation and concentration with Wilfleys and vanners. Considerable percentage of the gold is free milling.

The many movements that have taken place in this immediate vicinity have caused the geology to be confusing. The chief country rock is slate with diorite porphyry in the footwall. In the upper levels trachyte is said to form a large part of the hanging wall. This trachyte was probably a feeder to some of the recent lava flows.

The lode has an east-west strike and a dip of 75° N. in the upper levels, but with a steeper dip below. In some places the lode is as much as 40 feet wide, but the actual quartz veins are rarely more than a few feet thick.

The chief gangue mineral is quartz and much of it is in a sugary condition, due to crushing by later movements. Some calcite is present in the vein. The ore, especially in the upper levels, is free gold, and many fine specimens have been taken from the mine. In the lower levels more sulphides are found. They are chiefly arsenopyrite, pyrite, galena and sphalerite. The galena and sphalerite are said to contain high values in gold.

The Humboldt lode is situated in a zone of weakness, where fracturing and movement have taken place many times. The first break allowed the injection of the diorite porphyry that is found on the footwall. Then came the fracturing that made the opportunity for the hot ascending silica solutions to deposit their burden of quartz and metallic sulphides. Movement took place during the period of vein formation, as is evidenced by the recementing of broken quartz fragments. Considerable post mineral movement has taken place, as is shown by the sugary quartz, the gouge, and the actual faulting of the vein in the lode. The presence of a trachyte dike goes to show further how great a zone of weakness there is here. A certain amount of pressure may still exist as a partial explanation for the bad ground in some parts of the mine, where large sized stulls are crushed in a short period of time. On account of the faulting that has taken place in this mine a careful geological map, combined with an assay map, would have been of considerable value as a guide to development.

HUMDINGER MINE**ASHLAND DISTRICT****JACKSON COUNTY**

The Humdinger mine, owned by C. Halstead, of Talent, on the ridge west of Wagner creek, has been prospected by shallow workings.

HUMDINGER MINE (gold) LOWER APPLGATE DISTRICT JOSEPHINE COUNTY

The Humdinger mine, 12 miles south of Grants Pass, in about Sec. 21, T. 38 S., R. 5 W., and very near the Rising Star mine, is owned by Scroggins and Mascall. The country rock is quartzite and argillite. An adit extends N. 75° W. 40 feet on a small vein of quartz, which dips about 70° N. E. The quartz is high grade gold ore in places. Work in progress in 1913 was near the surface.

HUSTIS AND ANDERSON GROUP (gold) CHINA DIGGINGS DIST. CURRY COUNTY

This property was not visited, but is described by Diller as follows:

The Hustis and Anderson claims are on the northwest slope of the Chetco divide on Miller creek, nearly a mile southwest of the Higgins claims, at an elevation of nearly 2,300 feet. The main contact of serpentine, running N. 20° E., lies just west of the mine which is mainly greenstone. A 100-foot tunnel to the east in greenstone reaches another contact in serpentine.

An old arrastre, now in ruins, gives evidence of milling some years ago. The principal serpentine contact with greenstone extends directly from the Higgins mine to the Hustis and Anderson claims, where it meets another body of serpentine from the east.

HUTCHINSON OIL AND GAS COMPANY**MALHEUR COUNTY**

Office: Union, Oregon. J. H. Hutchinson, Pres.; N. Schoonover, Sec., both of Union, Oregon. Capital stock, \$25,000; par value \$1.00; \$16,000 subscribed and issued and \$1000 paid up. (1916 report).

HYDRAULIC MINES DEVELOPMENT COMPANY (placer)**GREEN MOUNTAIN DISTRICT****DOUGLAS COUNTY**

Office: 1334 Northwestern Bank Bldg., Portland, Oregon. J. C. Williams, 210 Second St., Portland, Pres.-Treas.; W. B. Shirley, 1334 Northwestern Bank Bldg., Portland, Sec. Capital stock, \$100,000; par value \$10; all subscribed, issued and paid up. (1915 report).

This company owned 19 claims, 380 acres, in Secs. 28, 29 and 32, T. 32 S., R. 4 W., on Starveout creek, 12 miles east of Glendale. Starveout creek is a tributary of upper Cow creek that drains the northwest slope of Green mountain. Several small placers on this creek have been irregularly active for a long time. The company now is out of business. (1916 report).

HYDRAULIC MINING COMPANY (placer) GRANTS PASS DIST. JOSEPHINE CO.

Local name, Cook and Howland mine.

Office: Three Pines, Oregon. G. E. Howland, Pres., Grants Pass, Ore.; Jefferson D. Cook, Sec., Three Pines, Ore. Capital stock, \$25,000; par value \$100; \$18,100 subscribed, issued and paid up. (1914 report).

This company is out of business. Its property, 9 miles east of Hugo and about 4 miles southeast of the Hammersely mine, located on upper Jump-off-Joe creek, in Secs. 24 and 25, T. 34 S., R. 5 W., is now owned by Elizabeth Smith, of Grants Pass, and leased by L. T. Corliss, of Three Pines, Oregon.

The property has only been operated in a small way the past year. Dissolved by proclamation in January, 1917.

HYDRO SIXES MINES COMPANY (placer) SIXES RIVER DISTRICT CURRY COUNTY

Local name, Hydro Sixes mine.

Office: 57 Post St., San Francisco, California. W. J. Bell, Pres.; George W. Root, Sec.; C. J. Pease, Treas., all of San Francisco; C. C. Inman, Bandon, Oregon, Attorney-in-fact. Capital stock, \$70,000; par value \$1.00; all subscribed, issued and paid up. (1915 report).

This company's property is located between Otter and Elephant Rock creek just below the forks of the Sixes river. This company ever since the autumn rains of 1915 has been washing gravel from the beds of the creeks tributary to the Sixes river and feels highly encouraged at the returns received. In their mining development the company has crossed the beds of 3 different ancient streams all at a considerable elevation above the beds of the present streams. They have water under a 150-foot head taken from Big Otter creek. The company up to January, 1916, had spent \$100,000 improving, equipping and getting ready for work. Fifty men were employed during the summer of 1915, cleaning the channel, constructing ditches and building flumes. They expect to spend about as much more to fully equip

the property, which consists of about 1200 acres. This information is secured from the Bandon Recorder of January 18, 1916.

IBEX MINE (gold) CRACKER CREEK DIST. GRANT AND BAKER COUNTIES

The vein at the Ibez mine strikes northeast with a steep dip to the southeast, and is located upon the divide between McCully fork and Granite creek in Secs. 3 and 4, T. 9 S., R. 36 E., about 8 miles northwest of Sumpter.

The elevation of the croppings is about 6300 feet, and the lowest and longest tunnel driven in from the western side of the divide is about 500 feet lower. The slopes are well wooded, as are practically all of the argillite areas, and from the croppings a fine view is obtained of Greenhorn mountains and the region to the west.

The vein entirely in argillite is developed by 4 levels, all but 1 of which has been driven from the surface. Most of the development, which totals about 1½ miles, has been done in the last 15 years. Development work upon the vein extends over a distance of about 3000 feet.

This vein, as far as developed, averages about 5 feet, with a maximum width of 25 feet. The vein material for this width was originally crushed and sheared argillite, the result of crumpling and movement of the earth's crust. Into this line of crushing upward flowing solutions deposited quartz between the fragments of argillite and has replaced in variable degrees of completeness much of these fragments with quartz. After the zone had been largely cemented together and much of the argillite fragments silicified another movement in the vein fractured the quartz and silicified argillite which was cemented together again by additional silica brought up from below.

Small amounts of sulphides are found in the quartz and in the argillite fragments. These sulphides consist of pyrite and arsenopyrite. White iron or marcasite and mercurial gray copper, with small amounts of other secondary minerals, are found. The average value of the large amount of ore is said to be so low that high extraction and strict economy would be required for profitable operations. There is a wide variation in the quantity of silver present in various parts of the mine, a variation which bears little relation to the amount of gold contained.

IDA CLAIM (gold-copper) GRANTS PASS DISTRICT JOSEPHINE COUNTY

For description of this property, see "Oregon Gold Mines Company."

IDAHO COPPER MINING COMPANY IDAHO

Office: 610 Spring St., Portland, Oregon. W. J. Patterson, Selling Bldg., Portland, Pres.; James F. Ewing, 610 Spring St., Portland, Sec.-Treas. Capital stock, \$20,000; par value 10 cents; all subscribed, issued and paid up. (1916 report).

This company's properties are located in Adams county, Idaho.

IDAHO MINE (placer) GOLD BEACH DISTRICT CURRY COUNTY

This property, which is situated on the present ocean beach, a mile south of Gold Beach, is the one which Mr. W. H. Williamson, of Gold Beach, attempted to work 7 years ago. Although a number of deep pits were dug on this property, they have since been so filled with wind-blown sand that it was impossible to examine the gold-bearing beds. From what was seen, however, it seems certain that these are here covered with many feet of worthless or low grade sand.

IDEAL MINING COMPANY NORTH SANTIAM DISTRICT MARION COUNTY

Office: 569 Spokane Ave., Portland, Oregon. A. B. Crosman, Pres.; Walter Adams, Sec.-Treas., both of Portland. Capital stock, \$250,000; par value 25 cents; \$145,000 subscribed, issued and paid up. (1916 report).

This company has 9 claims on Gold creek, named as follows: Michigan, Montana, Oregon, Indiana, Kuskogwin, Neukluk, Alma, Buckeye and Colorado. Assessment work only.

IMNAHA MINE (gold)

WALLOWA COUNTY

This gold mine, also known as the Winchester mine, from S. L. Winchester, one of the men active in its development, is located in Sec. 10, T. 35 S., R. 49 E., about 400 feet from Battle creek, which empties into the Snake river about one mile below the mine. The mine is 25 miles north from Homestead and 40 miles east from Joseph, the railroad terminus, from which a good wagon road goes to within 4 miles of the property.

A tunnel 1000 feet long is now being run. The vein is three and one-half feet wide. There are 4000 feet of tunnels, shafts and crosscuts in the property now. Battle creek is but 400 feet from the property, and the mill is operated by a 50-horsepower Pelton wheel. The buildings are large enough for a plant handling 50 tons each day. The present mill handles 10 tons daily. There is also a sawmill and complete buildings for our employees. The concentrates assay \$300 to \$500 per ton. We have 50,000 tons of ore blocked out.

The above quotation is from a reported interview with S. L. Winchester in Portland Telegram of February 1, 1916. The property has not been visited.

IMPERIAL MINE (gold-silver)

CABLE COVE DISTRICT

BAKER COUNTY

This property of the Imperial Mining and Development Company comprises several claims situated in Cable Cove district, at 6500 to 7700 feet elevation, on a glaciated slope south of the divide between Silver creek and North fork of John Day river, in Sec. 15, T. 8 S., R. 36 E. The property includes the Eagle, Imperial, Winchester and some other veins.

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

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

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

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

The Imperial vein, usually from 3 to 4 feet wide, although there are places much wider, probably has the greatest alteration of the granodiorite between

its walls of any vein in the district. The narrow lenses up to 24 inches wide, with stope and pitch length of usually less than 50 feet, are found usually near the hanging wall. The vein filling is made up of the fragments of granodiorite considerably altered, while considerable widths have been completely altered to a soft white gouge. This is usually close to or surrounding the lenses of ore. This alteration extends often into the wall rock of the vein and is doubtless due to the ascending hot waters which deposited the ore and altered the brecciated vein and the wall rock. The total production probably does not exceed \$75,000.

INDEPENDENCE MINE (gold)**GRANITE DISTRICT****GRANT COUNTY**

Four miles north of Granite and in Sec. 20, T. 8 S., R. 35½ E., a mile northeast of the Cougar mine, and on the north slope of the ridge cut by the Cougar vein, lies the Independence mine, also in argillite. The early history of the mine is obscure, though it has been worked within the last few years, and a small production was reported in 1907. The workings comprise two tunnels, an upper 250 feet long, a lower 1020 feet long, and a shaft 210 feet deep, intersecting the second tunnel 440 feet from its portal. A portion of the longer tunnel, wholly in oxidized zone, was accessible in 1914.

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° S. E. 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 pyrrhotite appear to be confined to dolomite. Faint stains of proustite occur on fractures. The total content of sulphide minerals does not exceed a few per cent. 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.

INGRAM CLAIMS (gold)**LOWER APPLIGATE DISTRICT****JOSEPHINE COUNTY**

The Ingram claims, 8 miles southeast of Grants Pass, are on Oscar creek and across the divide on Savage creek. On Oscar creek, in Sec. 14, T. 37 S., R. 5 W., the country rocks are Paleozoic argillites, sandstones and limestone cut by porphyry and serpentine. The limestone near Ingram's cabin strikes

N. 10° E. and dips about 45° E. Ingram's adit No. 1, at an elevation of about 3100 feet, shows some porphyry in its 150 feet of length, but does not reach unoxidized ore. His adit No. 2, at an elevation of about 2900 feet, is about 120 feet in length, the last 20 feet being in a green shaly rock with black indurated talc or gouge in seams, while the adit elsewhere is in andesitic porphyry. Ingram's adit No. 3, at an elevation of about 2300 feet, is only 30 feet long; it discloses gold ore, said to be high grade, but no well defined vein.

INK AND BARR PROPERTY (placer) OPHIR DISTRICT CURRY COUNTY

When this investigation was made, L. G. Ink and Will Barr were working the Old Bonanza claim, now called the Gold Slug, which they purchased from George Curry. They also located on March 10, 1915, 3 other claims along Boulder creek below the Gold Slug, which they called Iron Mountain, Nugget Bar and Lily, making their total holdings a mile in length; \$1500 worth of gold is said to have been taken from the Gold Slug claim before the present owners purchased it.

The present owners began work in April, and at the time of the examination were sluicing the loose surface soil on the south side of the creek, in which they were finding gold from grass roots to a depth of about a yard. This gold was coarse, the pieces averaging 25 to 50 cents each, and including nuggets worth \$6 to \$10 each, and often larger, although the largest they had on hand at the time of the examination was worth something over \$2. They state that Curry secured one nugget worth \$65 from this claim, and that they found another weighing 4 ounces, 9 pennyweights, for which the mint paid them \$93.60. Most of the gold is decidedly worn, but some is so jagged that it could not have come any considerable distance.

One or more old terraces exist on the southern hillside above the present workings, and it seems likely that the gold has slid down from these, although they do not appear to be as rich as is the loose material now being sluiced, of which 250 cubic yards are said to have yielded \$100 in gold. The bedrock beneath the present workings is serpentine, but the contact between this material and Myrtle sandstone crosses the Gold Slug claim.

Below the Gold Slug the stream widens and a decided flat has developed. That gold is present here seems well established, but the nature of the ground is such that it must be worked, if at all, on an extensive scale by means of giants. At the time of the examination two men were prospecting on the lower end of the Lilly claim, but had not done sufficient work to indicate the value of the deposit.

Above the Gold Slug claim is the Blue Bell placer, owned by D. Chapin and H. Rowlan; while above this is the Big Nugget claim, located by John R. Hurst during the rush to this district occasioned by the Smith discoveries on Rock creek. Practically no work has been done on these claims, and no further data concerning them were obtainable.

INTERMOUNTAIN CLAIMS (silver-gold) GREENHORN DISTRICT GRANT COUNTY

These claims are located in the northeast corner of T. 10 S., R. 35 E., and about ½ mile north from the Bimetallic 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 this property was not visited.

IRON DYKE COPPER COMPANY (copper) (Pennsylvania corporation) HOMESTEAD DISTRICT BAKER COUNTY

Local name, Iron Dyke mine.

Office: Erie, Penn. F. F. Curtze, Pres.; F. A. Brevelier, Sec.; A. A.

Claus, Treas., all of Erie, Penn.; A. G. Miles, Homestead, Oregon, attorney-in-fact. Capital stock, \$500,000; par value \$1.00; \$380,000 subscribed, issued and paid up. (1915 report).

Erie Trust Company holds title by trust deed and bond. Worked by Homestead-Iron Dyke Mines Company.

This copper deposit, discovered in 1897, is situated about 2000 feet from the railroad at Homestead. The lower tunnel is about 300 feet above the town. The main croppings are about 375 feet above the lower tunnel and 70 feet below the croppings is the upper tunnel. Down 50 feet farther is an intermediate crosscut, and midway between the latter and the lower tunnel is a fourth crosscut.

The lower tunnel is in some 1300 feet, cutting the ore body about 800 feet in and, passing through it, continues on without discoveries. A zigzag raise connects this tunnel with the three tunnels above. Unfortunately this raise was started a hundred feet beyond the ore in the lower tunnel, and much other development could have been placed to better advantage. The opportunity here to block out the ore and to determine its limits were excellent.

The series of trachytic or perhaps rhyolitic flows here have been so badly altered and silicified that they are now a chloritic indefinite greenstone. Intercalled with the flows is a body of dark brown altered andesite, which may have been an intruded sill.

The greenstone in the hand specimen is in color light green and quite dense. Under the microscope thin sections vary from very fine grained to considerably coarser, but contain very poorly formed silicified feldspars in a ground mass of abundant sericite with some chlorite and a few crystals of secondary quartz. Minute faulted quartz veinlets are revealed throughout this altered greenstone. No thin sections were made of the meta-andesite to determine exactly its present character.

Although the character of some of these flows, due to a variation in their composition and structure, might be much more favorable to concentration than other flows, nevertheless the factor of most importance here is the opportunity for ore concentration through fault planes and shear-zones.

A considerable amount of shearing and faulting has taken place in this immediate vicinity. Several pronounced slips were noted, all having a strike of N. 20° E., and dipping at rather high angles eastward. For a considerable width a shear zone, many feet wide, has the same general direction. The best ore in the lower tunnel is massive chalcopyrite and pyrite, with but little quartz, as a gangue in a lens-shaped body dipping 60° E., with a maximum width of about 6 feet, which is said to extend from the lower to the upper tunnel.

On the west side of the lens in a short crosscut from the lower level the ore seems to be cut off rather sharply by a fault. On either side of this high grade ore, which is said to average 15 to 20 per cent copper, is a much larger body of disseminated pyrite and chalcopyrite in the chloritic greenstone, in which are abundant quartz seams, veinlets and nodules that contain pyrite. There is often a silicification of the rock itself. Statements are made that it contains about \$2 in gold, and 6 to 30 ounces in silver, regardless of the per cent of copper present. This deposit, both high and low grade, is in a zone of crushing in which copper-bearing solutions have deposited their contents largely by replacement.

This series of rocks has suffered severely and has become badly altered. This, of course, creates the best conditions for the concentration of metallic minerals whenever opportunity offers, whether it be in great or small fractures, shear zones, or in amygdules. In this particular property a study of thin sections has shown the formation of minute veins which were afterward broken. The field evidence clearly shows the faulting and shearing that have

taken place. All of these conditions are favorable to the deposition of copper minerals that have been dissolved from the greenstone series, which practically always contain some copper.

However, as noted before, the presence of such an amount of highly silicified rock and the fact that the gold and silver values are considerable and independent of the copper content, seems to indicate an impregnation of this shear zone from sources connected with the granodiorite. The gold and silver and possibly some of the copper impregnated the shear zone, which at a later time, having been resheared, has permitted a reconcentration of copper from the shear zone along principal planes, assisted by a deposition of copper brought in from the greenstone walls, from which it had been dissolved by circulating waters of moderate depth and temperature.

In 1915 a lease and bond was executed in favor of the Homestead-Iron Dyke Mines Company to Halstead Lindsley, of 60 Broadway, New York, general manager, who placed Emmett Galligan in charge of the property as manager. About August 28, 1915, work was begun at this property, which had had a watchman only for a few years. Shipment to custom smelters of gold and silver-bearing copper ore began almost at once. For the year ending August 28, 1916, 462 50-ton cars of copper ore were shipped, which is said to have averaged more than 6 per cent net copper, besides about \$5 in gold and silver per ton. The average shipments of crude ore for the year 1916 have so far been at least 2500 tons monthly.

Commodious and comfortable bunk and boarding houses have been erected, as well as several bungalows for officials and others. A concentrating plant has been erected and started operation about September 25, 1916. This mill has a guaranteed capacity of 125 tons and probably averages at least 150 tons daily. The mill feed, which consists of the ore too low grade to ship crude, goes from the crusher to a ball mill, which reduces it to 60 mesh and concentration is effected by flotation and extraction of 90 per cent. The mine is located about $4\frac{1}{2}$ miles from the Oxbow hydro electric plant and a high line was constructed in 1916 to the mine. Previous to this time the compressor was driven by steam power with coal as fuel. The mine and mill are now operated by electric power. It is said that the shipment of crude ore will be continued, to which the operation of the mill has added a considerable daily tonnage of concentrates.

IRON HILL GROUP (iron)

AGNESS DISTRICT

CURRY COUNTY

The Iron Hill group includes all the claims on Wake-Up-Riley ridge, about 4 miles southwest of Agness. The deposits exposed are in schist and are so similar in appearance that only 2 were sampled. Each is developed by an open cut, one being about 600 feet south of the other. One deposit is a typical small lens of manganiferous magnetite, which analyzes 28.43 per cent iron, 12.50 per cent manganese, 0.72 per cent phosphorous, and no titanium, arsenic, copper or sulphur. The other was the best-looking deposit examined. An open cut 5 feet wide, 8 feet long and 5 feet deep at the face was entirely in ore, although the manganiferous magnetite is traversed by numerous quartz seams. A sample from this prospect analyzed 22.87 per cent iron, 7.30 per cent manganese and 0.56 per cent phosphorous, and no titanium, arsenic, copper or sulphur.

IRON MASK COPPER COMPANY (copper)

SPARTA DISTRICT

BAKER COUNTY

Local name, Iron Mask mine.

Office: Baker, Oregon. Mine office: Sparta. F. R. Mellis, Pres.; J. A. Howard, Sec.-Treas. Capital stock, \$250,000; par value \$1.00; all subscribed, issued and paid up. (1914 report).

All ground, consisting of 22 claims near Sparta butte and extending to

Sawmill gulch, is now in farms. No report last year. No assets. Dissolved by proclamation in January, 1917.

ISIS OIL AND GAS COMPANY

Office: 495 E. 35th St., Portland, Oregon. R. E. Morrell, Pres.; John B. Hibbard, Sec.; O. Rudig, Treas., all of Portland, Oregon. Capital stock, \$500,000; par value \$1.00; \$250,000 capital stock subscribed, \$137,634 issued and paid up.

JACKLEY CLAIMS (gold) CORNUCOPIA DISTRICT BAKER COUNTY

The "Jackley" vein is about $\frac{1}{4}$ mile west of the Wild Irishman vein, at a little lower elevation. It is about $1\frac{3}{4}$ miles west of the Union-Companion mill. It is a vein of fair width and considerable work is being done upon it by the owner. Fair values are encountered in the drift at times, although the main objective has not yet been reached. The surface beyond shows some displacement of the vein by basalt dikes, which may prove troublesome. Fragments of greenstone in dimensions from a few inches to a few feet are found here in the granodiorite. The granodiorite is more basic, probably due to its melting and assimilation of greenstone. Some of the unmelted fragments actually show recrystallization decreasing toward their interiors. This place is probably near the roof of the intrusion, only a downward projection of the greenstone roof remaining, the rest having been eroded away.

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

JACKSONVILLE MINING AND MILLING COMPANY (placer) JACKSONVILLE DISTRICT JACKSON COUNTY

Office: Jacksonville, Oregon. Mary E. Day, Pres.; Kate Hoffman, Sec.-Treas., both of Jacksonville, Oregon. Capital stock, \$10,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company owns 40 acres of placer ground in the S. W. $\frac{1}{4}$ Sec. 25, T. 37 S., R. 3 W., 4 miles west of Jacksonville.

JACKSONVILLE PLACER JACKSONVILLE DISTRICT JACKSON COUNTY

The chief placer deposit is along Jackson creek, where one of the early discoveries of gold in Oregon was made in the fall of 1851, and the Jacksonville district, including both forks of the creek and its tributaries, was organized the following year. Both forks were worked as placer from the town up stream for a mile or more; some gravel was worked within the town limits. The bedrock of the placer on the south fork is a rock consisting of very fine quartz, pale brown mica and a black dust resembling magnetite.

JANUARY FIRST MINE (gold) WALDO DISTRICT JOSEPHINE COUNTY

The January First mine, about 3 miles east of Holland, is owned by Harry Siskron, who has operated it successfully on a small scale for several years. It is on the southwest side of Sucker creek, at an elevation of about 2400 feet, a little more than a mile from the "mountain ranch," and about the same distance from California bar. The mine is opened by a crosscut adit extending N. 75° W. about 110 feet to a quartz vein about 18 inches thick, which strikes north and dips 45° W. A drift runs north 30 feet and south 100 feet; at the south breast a 3-inch vein of quartz strikes east and dips 60° N.; here the main vein is nearly pinched out and contains no ore of value. From the drift stoping has been carried up to the surface. The ore is packed on burros to an arrastre on Sucker creek; the tailings are saved and concentrated on a canvas table. A small mill was recently installed on this property.

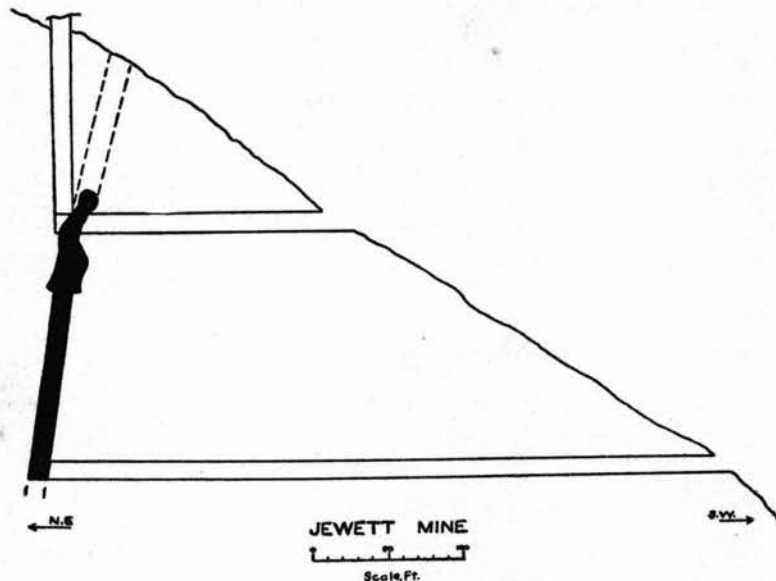
JEWELL & LEWIS (placer) GALICE DISTRICT JOSEPHINE COUNTY

The Jewell & Lewis placer, now known as the Rock Gulch placer, is owned by H. L. Lewis, of Galice, and associates. It is located on Rogue river, about

1 mile below the mouth of Rocky gulch. It was worked by hydraulic methods with water from Rocky gulch, but was inactive in 1913. The gravel forms a bar in the river and also rises to a bench about 15 feet above water level. The gravel has been raised by a steam shovel and then washed by a giant through a revolving screen to remove the coarse material, after which the fine sand passes into the sluice boxes.

JEWETT MINE (gold)**GRANTS PASS DISTRICT****JOSEPHINE COUNTY**

The Jewett mine is near the north line of Sec. 34, T. 36 S., R. 5 W., about 4 miles by wagon road from Grants Pass. It was discovered about 1860 by Thomas Jewett, and was recently sold to Claus Schmidt, of Grants Pass. In



Section through the Jewett mine; ore body in solid black

1863 it was provided with an 8-stamp mill, which proved a failure, and was converted into a sawmill. At present it is equipped with a 5-stamp mill, but is not in operation. The accompanying sketch gives a section through the mine and affords an idea of the ore body and the workings.

The country rock is often called greenstone, but much of it is fine grained tonalite, containing abundant plagioclase, quartz and pale green hornblende. Coarse grained tonalite forms a large outcrop on the north side of Baldy mountain, on the south side of which the Jewett mine is situated, and a dike of the same rock is visible at the portal to the main adit. The ore body in general has no definite walls, but occupies a sheared and brecciated zone, which is irregular in thickness and direction. The general direction of the ore body is N. 20 to 55° W., with an average dip of about 75° N. E. The ore has been produced partly by replacement and partly by deposition as a cement of the breccia. The gangue minerals are chiefly quartz and calcite (with the former dominant), with some chlorite and pale brown mica. The ore minerals include native gold, pyrite, sylvanite and pyrrhotite. Considerable ore was mined and milled. In portions of the mine the ore body is more than 8 feet wide. For some years past the mine has not been in operation.

JIM BLAINE MINE (gold)**GREENBACK DISTRICT****JOSEPHINE COUNTY**

The Jim Blaine mine is located in the N. W. $\frac{1}{4}$ Sec. 4, T. 34 S., R. 5 W., about half a mile south of the Greenback mine and half a mile northeast of the

town of Placer. It is equipped with small stamp mill and concentrator operated by water power, which has proved to be not very efficient in saving the values. It is owned by George Epperly, of Placer, who proposes to ship some of the ore to Tacoma and abandon the mill.

JIM FISK MINE (gold)**CORNUCOPIA DISTRICT****BAKER COUNTY**

The Jim Fisk vein is located but a few hundred feet west of the Mayflower vein and about $\frac{3}{4}$ mile west from the Union-Companion mill. Where observed there was a very large mass of quartz 20 to 30 feet wide. To both the north and the south this soon narrows down to ordinary widths. No shoot of ore has been encountered. The country rock is granodiorite.

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

JOHNSTON MINE (placer)**UPPER APPLGATE DISTRICT****JACKSON COUNTY**

The Johnston mine, 3 miles northeast from Applegate, in Sec. 11, T. 38 S., R. 4 W., at the junction of the west branch with the main Humbug creek, is owned by W. H. Johnston. The bank averages about 8 feet in thickness and contains considerable clay, in which the main values are found. Boulders of greenstone and granodiorite from 6 inches to more than 8 feet in diameter are present. The bedrock consists of fine grained greenstone, much fractured and veined. The mine is equipped for hydraulicking, the water being brought from Humbug creek. Usually worked only 3 or 4 months of the year with water available.

KALAMAZOO OCEAN BEACH MINE (placer)**CURRY COUNTY**

Diller states that the time he made his last investigation in this region this mine was reported to be the most productive in Curry county. He says that it is located in the Ophir district near Corwin, which is in Sec. 20, T. 34 S., R. 14 W. This "Ophir district" refers to the territory near Ophir, a town, and not Ophir mining district, near Ophir mountain, in the eastern part of Curry county.

KELLY MINE (gold and silver)**ROCK CREEK DISTRICT****BAKER COUNTY**

This property, owned by D. M. Kelly, of Baker, Oregon, is located on the north side of the West fork of Rock creek, in Sec. 15 or 16, T. 8 S., R. 37 E., at an elevation of about 8000 feet. The vein, which is of the usual Cracker creek type, is in argillite, but the granodiorite contact is only about $\frac{1}{4}$ mile to the north. The strike of the vein varies between N. 60° E. and N. 85° E. The dip is about 70° N. The ore minerals are zinc blende, pyrite, galena and a copper mineral which may be tetrahedrite. The development work consists of 4 tunnels with a depth from the top of the ridge of about 600 feet for the lowest one. The lower tunnel is about 600 feet long and the others above are about 300 feet each. Most of the development is drifting and exposes ore, which varies from a foot or two up to 10 feet or more wide. The average value of the ore is claimed to be at least \$10.

KELSO GOLD MINING AND MILLING COMPANY BOHEMIA DIST. LANE COUNTY

Office: Kelso, Washington. W. P. Ely, Kelso, Washington, Pres.; M. E. Hubbard, Sec.-Treas. Capital stock, \$70,000; par value \$1.00; all subscribed, issued and paid up. (1913 report). Dissolved by proclamation in January, 1917.

KENT MINE (gold)**BAKER DISTRICT****BAKER COUNTY**

The Kent mine, also called the Stub mine, in the upper part of Washington gulch, has the most development work of any in this area. It is located in Sec. 20, T. 9 S., R. 39 E., and has a small, poorly designed mill, located about $1\frac{1}{4}$ miles away from the mine.

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

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

KERBY QUEEN (or SOWELL) MINE (copper) WALDO DIST. JOSEPHINE COUNTY

This property is now (1916) under option to John Hampshire, of Grants Pass, and Twohy Brothers, of Portland, who are doing some development work with a view to opening up other bodies of copper ores. It is located in the S. E. $\frac{1}{4}$ of Sec. 17, T. 40 S., R. 7 W. The workings consist of 2 adits; the upper is about 240 feet in length and is mostly in weathered rock. The ore is a mixture of the sulphide and oxide minerals. Ore on the dump shows pyrite and a small amount of marcasite, associated with the chalcopyrite, and pyrrhotite. The ore is said to run \$6 in gold in carload lots.

The lower adit is about 700 feet long (August, 1913) and in serpentine all the way. Ore is expected when the limit of the serpentine is reached, estimated to be 60 or 70 feet further.

Twelve or thirteen years ago a 10-ton smelter was installed in connection with this property and operated for 26 days, producing 32 tons of matte carrying copper and gold, to the value of \$2000.

On the west end of this property an important deposit of chrome iron ore has been developed by D. W. Collard and son. More than a thousand tons of chrome were mined and shipped during the summer of 1916. For more details, see description of the Golconda mine.

KESSLER AND FRYS' PROPERTY (copper) COLLIER CREEK DIST. CURRY CO.

This prospect, which is owned by William Kessler and John, Walter and Marshall Fry, is on the ridge between North Collier and Lawson creeks, about 10 miles by trail south of Agness, at an elevation, as determined by barometer, of 4200 feet. The country rock here is serpentine, but a dike of quartzite-like dacite-porphyry about 100 feet thick occurs a short distance to the east. Beyond this are a few hundred feet of greenstone, then several hundred feet of Colebrooke schist, followed by a succession of serpentine and peridotite masses down almost to the Illinois river. How far to the west of the claim the serpentine runs is unknown, but it undoubtedly eventually gives place to Colebrooke schist in that direction.

A 50-foot tunnel, which bears S. 34° W., has been run into the serpentine not far from the dacite-porphyry contact. No ore is exposed in this tunnel, and it was doubtless driven with the intention of cutting a mineralized zone nearby. Some copper-stained material occurs in a wash near the tunnel, and big chunks of good ore are said to have been picked up on the flats below, but their exact source is unknown.

KEYSTONE GROUP (gold) GALICE DISTRICT JOSEPHINE COUNTY

The Keystone group, belonging to the Akron Gold Mining and Milling Company (dissolved Jan. 11, 1916), is on the south slope of Rogue river nearly opposite the mouth of Whiskey creek. It was not visited by the writer. According to Diller:

There are two openings far above the river. One of them, 115 feet in length, cuts the ledge at a depth of 100 feet; the other, 160 feet lower, is only partly completed. The country rock is greenstone near its contact with intruded serpentine. The gold occurs in irregular quartz veins or stringers, forming a belt about 3 feet in thickness and approximately parallel to the serpentine contact. The ore appears to be pyrite in fine particles sparsely disseminated through the quartz.

KEYSTONE MINING AND MILLING COMPANY (gold)
QUARTZBURG DISTRICT GRANT COUNTY

Local name, Keystone mine.

Office: 1215 Wilcox Bldg., Portland, Oregon. J. Frank Watson, Pres.; Wm. M. Ladd, Sec.-Treas., both of Portland, Oregon. Capital stock, \$50,000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company's property is located in Sec. 2, T. 12 S., R. 33 E., about 7 miles northeast of Prairie City, Oregon, on Dixie creek, and about 1/2 mile above the Present Need mine, the property of the Comer Mines Company. 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.

KNAPPA COAL COMPANY CLATSOP COUNTY

Office: Astoria, Oregon. B. VanDusen, Astoria, Ore., Pres.; J. N. Griffin, 322 Corbett Bldg., Portland, Ore., Sec.; H. G. VanDusen, Astoria, Ore., Treas. Capital stock, \$100,000; par value 10 cents; \$87,500 subscribed and issued; \$62,450 paid up. (1916 report).

This company has 750 acres of land in Secs. 8, 9, 10, 11 and 12, T. 8 N., R. 7 W., in Clatsop county.

KOEHLER ANTIMONY MINE (antimony and gold) VIRTUE DIST. BAKER COUNTY

This property is 4 1/2 miles east of Baker, situated on the opposite and western side of the ridge upon which the Virtue mine is located, and about 3 miles northwest from the latter. It became a producer of high grade antimony ore late in 1915, due to the high price of antimony caused by the European war. The vein is a well-defined one with a maximum width of about 10 feet of vein material containing both gold and stibnite. The stibnite is found scattered throughout the entire width of the vein, but the massive antimony ore is confined to a thickness of about two feet near the hanging wall where locally the lenses are shipped entire. In other places it is cobbled to bring it up to shipping grade. Several car loads containing over 50 per cent antimony were shipped, which were reported to have returned to Dr. A. Koehler, the owner, about \$15,000. Much more ore could have been shipped if the owner had hastened the blocking out and stoping of ore while high prices prevailed.

KRAMER GROUP GALICE DISTRICT JOSEPHINE COUNTY

See "Elwilda or Kramer" group.

KRAUSE (J. L.) CLAIMS (gold and copper) NEW ELDORADO DIST. GRANT CO.

This group is located on a shear zone which is mineralized in places. Pyrite is the chief ore mineral. Pyrrhotite and some chalcopyrite are also present. This zone strikes about N. 60° E. and appears to be somewhat similar to those on the southern slope of the Wallowa range, of which the Poorman is a type, although the shearing and percentage of copper is much less. How much gold and silver is present was not learned.

LA BELLEVIEW MINE (gold-silver) GRANITE DISTRICT GRANT COUNTY

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 7000 feet and 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, Utah.

The mine workings extend from the top of the ridge southwest, into the ravine forming the north fork of Onion creek. Little work has been done since 1907, and the workings on the vein are now inaccessible. This descrip-

tion 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 pyrargyrite, possibly 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 Wide 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.

LADD METALS COMPANY

IDAHO

Office: 302 Concord Bldg., Portland, Oregon. Chas. E. Ladd, Portland, Pres.-Treas.; A. E. Davis, Portland, Sec. Capital stock, \$500,000; par value \$100; \$262,000 subscribed, issued and paid up. (1916 report).

This company's properties are located near Mineral and Landore, Idaho. This corporation is in process of liquidation.

LA GORE GROUP (copper, gold, silver, molybdenite) WALLOWA DIST. WALLOWA CO.

This group is reached by 5 miles of wagon road up Hurricane creek from Joseph, the railroad terminus, and about 2 miles of a zigzag trail up Fall creek, 2500 feet above Hurricane creek. Here the elevated hanging valley has steep walls of badly contorted and faulted schists and marbled limestones along the irregular granitic border of the intrusion.

The deposit is 4 to 8 feet wide, has a general north-south strike and dips 60° toward the west. Considerable faulting is apparent, but the outcrops of rock in place are so nearly continuous that little difficulty should be experienced in locating these fault blocks. The principal contact-metamorphic minerals are garnet, epidote, quartz, calcite, chalcopyrite, pyrrhotite, and in the most northern claim, molybdenite.

Several cuts and 2 short tunnels constitute the development. The best appearing surface cut has chalcopyrite and pyrrhotite abundantly disseminated in what is probably an altered granodiorite. Here the vein is about 4 feet wide and is said to contain about \$9 in gold, \$2 in silver and \$10 in copper.

LAMB MINE

ASHLAND DISTRICT

JACKSON COUNTY

For description see "Bula Mine."

LAMPA COAL MINING COMPANY**COOS COUNTY**

Office: Bandon, Oregon. J. J. O'Neil, Eugene, Pres.; E. B. Caranaugh, Edgewood, Cal., Sec.; T. Jones, Hornbrook, Cal., Treas. Capital stock, \$50,000; par value \$1.00; \$40,600 subscribed and issued. (1916 report).

This company owns the Lampa coal mine in Coos county, but there is no activity at the mine at present.

LANCE MINE (placer)**GOLD HILL DISTRICT****JACKSON COUNTY**

The Lance mine, 15 miles southwest of Gold Hill, is on the right fork of Footh creek, in the S. E. $\frac{1}{4}$ Sec. 22, T. 37 S., R. 4 W. It is owned by the Lance brothers, but is leased at present. The bank has in places a thickness of 20 feet; much of the material is fine. The bedrock consists of lenses of limestone in slates, which are cut by dikes of greenstone. The bed of the stream has been mined for about one-third of a mile, and there is still considerable good ground to be mined.

LANE COUNTY MINING COMPANY**BLUE RIVER DISTRICT****LANE COUNTY**

Office: Eugene, Oregon. George F. Dorris, Springfield, Pres.; B. F. Dorris, Eugene, Sec.-Treas. Capital stock, \$100,000; par value \$5.00; all subscribed, issued and paid up. (1915 report).

Company owns 3 patented claims on vein which strikes northwest and southeast.

LAST CHANCE MINE (gold)**CABLE COVE DISTRICT****GRANT COUNTY**

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 on 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 not 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.

LAST CHANCE MINE (gold)**GOLD HILL DISTRICT****JACKSON COUNTY**

The Last Chance mine, 3 miles south of Gold Hill, on Galls creek, is in the N. E. $\frac{1}{4}$ Sec. 33, T. 36 S., R. 3 W. Over the divide from the Braden on the slope of Galls creek, at an elevation of 1800 feet by barometer. It is opened by an adit extending about 250 feet nearly due east, which discloses an irregular quartz vein 6 to 30 inches thick. Near the breast the vein strikes N. 74° W. and dips about 15° N. E. The country rock is a fine grained andesite containing some secondary chlorite and calcite. A 2-stamp mill has just been installed, which is equipped with the Perkeypile device to revolve the stamps; it has a 4 by 8-foot plate and electric power.

LAYTON MINE (placer)**UPPER APPLEGATE DISTRICT****JACKSON COUNTY**

The Layton mine is part of the estate of J. F. Layton, and is under lease and bond by Austin Wilson, of Boston, Mass. It is located 2 miles west of Applegate, in Sec. 20, T. 38 S., R. 4 W. The average thickness of the gravels is about 25 feet and the width is more than 200 feet. The best values are found in an old channel about 15 feet below the level of the present stream bed. The bedrock is greenstone, which in places is distinctly vesicular and greatly fractured and veined. Mr. Layton put in 2 ditches, the upper of which is 21 miles long and the lower 18 miles. Three giants are used under a head of about 300 feet. A considerable area of good ground remains to be washed.

According to a late report, Mr. Wilson is installing considerable additional equipment in order to effect a better saving of values and increase the amount

of material handled. This equipment includes 2 Pierce amalgamators and a large winch to use on a derrick to handle the stumps and large boulders. He proposes further to install an electric power plant for both light and power. The mine has been a good payer for years and it is expected that the improvements will be the means of materially increasing its production.

LEMON'S (IRA) PROSPECT (gold) NEW ELDORADO DISTRICT GRANT COUNTY

Between the Heppner mine and Granite Boulder creek are Ira Lemon's claims in granodiorite and greenstone, both considerably altered. A 4-foot lenticular vein strikes N. 20 to 30° E. The ore minerals are pyrite, arsenopyrite and chalcopyrite. The gold content was not learned.

LEWIS & CLARK MINING AND MILLING COMPANY (gold-silver)

NORTH SANTIAM DISTRICT

MARION COUNTY

Office: Silverton, Oregon. Dr. F. M. Brooks, Oregonian Bldg., Portland, Pres.; Thos. Skaife, Sec., and M. Palmer, Treas., both of Silverton. Capital stock, \$100,000; par value 10 cents; \$71,000 subscribed, issued and paid up. (1916 report).

Property of 5 claims is situated near the Little North fork of the Santiam, in Sec. 27, T. 8 S., R. 5 E., and about 18 miles northeast of Gates, a station on the Detroit branch of Southern Pacific railway. Reached by good wagon road for the first 13 miles, and the last 5 miles by a good trail from Gates.

The development work amounts to some several hundred feet of tunnel work on 2 levels on the property, exposing veins from 1 to 5 feet wide, which are mineralized shear zones in andesite. The ore contains gold and silver in zinc, copper and iron sulphides. The property has several cabins and a water power plant. A small amount of development work is done each year.

LEWIS PLACER

GALICE DISTRICT

JOSEPHINE COUNTY

See "Jewell & Lewis" placer.

LIBBY MINE (coal)

COOS BAY DISTRICT

COOS COUNTY

This mine is 3 miles southwest of Marshfield. The coal bed outcrops on the slope of the hill and is opened and developed by a tunnel. The thickness of the coal beds is between 5 and 6 feet with 2 shale partings—the upper one 9 inches thick and 6 inches from the roof, the lower about 8 inches thick and about 2½ feet from the bottom, leaving 2 coal beds more than 2½ feet thick. The upper 6-inch seam is usually left in the roof.

The coal is of the sub-bituminous variety, the analysis of which is as follows:

	Total Moisture	Volatile Matter	Fixed Carbon	Ash	Sulphur	Air Dry- ing loss	Heat Value B.T.U.
Libby mine, 3 mi. S. W. of Marshfield.....	24.90	39.80	27.27	8.03	.75	9.7	8490
Moisture free		53.00	36.31	10.69	1.00		11306
Moisture and ash free.		59.33	40.67		1.12		12659

The mine is working about 13 men at present, and is leased by the Coos Bay Fuel Company, under the management of George Doll.

LIDDY GROUP (gold-silver)

CONNOR CREEK DISTRICT

BAKER COUNTY

Between 1 and 2 miles south of the Snake River Mining Company's property and about 1 mile north of the Connor Creek mine, in Sec. 34, T. 11 S., R. 41 E., at an elevation of about 3500 feet, is a group of claims owned by J. J. Liddy. The vein in places is several feet wide. It has been subjected to a great deal of movement, which has produced much sugary quartz. On account of this movement and faulting, there is much difficulty in following the vein. The gold values were not learned, but small bunches of tetrahedrite were observed in the vein.

LIKEN'S PROSPECT (gold) GOLD HILL DISTRICT JACKSON COUNTY

Liken's prospect is near the S. W. $\frac{1}{4}$ Sec. 26, T. 36 S., R. 4 W., about 2 miles south of Woodville, at an elevation of 1850 feet by barometer. A crosscut entry extends southeast about 100 feet and thence a drift follows the vein about 40 feet. In the breast the vein is vertical and contains only 2 to 6 inches of quartz. The dump shows fragments of white vein quartz frozen to the country rock and containing a little pyrite and a metallic mineral which may be a telluride. The country rock is a "greenstone" similar to that at the Harth and Ryan mine.

LILLY M. MINING AND DEVELOPMENT COMPANY ALASKA

Office: Eugene, Oregon. Edgar Grim, Nome, Alaska, Pres.; W. H. Kay, Eugene, Sec.; L. M. Bounds, Eugene, Treas. Capital stock, \$20,000; par value \$100; all subscribed, issued and paid up. (1913 report). Dissolved by proclamation in January, 1917.

This company's properties are located on Seward Peninsula, Alaska.

LINCOLN MINES COMPANY (lead, gold and silver) QUARTZVILLE DIST. LINN CO.

Local name, Albany mine.

Office: Albany, Oregon. A. M. Hammer, Pres.; J. Deo McClain, Sec.; J. McChesney, Treas., all of Albany. Capital stock, \$250,000; par value \$25; all subscribed, issued and paid up. (1916 report).

This company has 8 claims in Sec. 23, T. 11 S., R. 4 E., about 23 miles from Gates. The country rock is andesite and the veins are only free milling near the surface.

Lead and zinc sulphides are found but a few feet below the surface. The veins are reported to be shear zones as much as 50 feet wide and to have lenses of heavy sulphides on foot or hanging walls and sulphides distributed through the zone. The values in gold are reported to be of fair grade.

The mine was equipped in 1892 with a 10-stamp mill, amalgamating plates, 4 Frue vanners, sawmill, etc., and produced a few thousand dollars from the plates and about 80 tons of concentrates were accumulated. The Albany Mining and Milling Company, then owning the property, became involved in the panic of 1893 on account of money borrowed and the property eventually passed to the Lincoln Mines Company. The mill is now in ruins.

About \$1500 worth of development work has been done on the property during the past summer.

LINDGREEN CLAIMS CORNUCOPIA DISTRICT BAKER COUNTY

See "Steen and Lindgreen" claims.

LISTEN LAKE GOLD MINING COMPANY (gold and copper) GREENHORN DISTRICT BAKER COUNTY

Local name, Listen Lake mine.

Office: Baker, Oregon. F. W. Thomas, Pres.; Fargo, N. D.; C. I. Flynn, Sec., Baker, Ore. Capital stock, \$500,000; par value \$10; all subscribed, issued and paid up. (1916 report).

This property consists of the Iron Dyke, Copper Dyke, Copper Butte, Copper Sentinel quartz claims and McNamee placers at the head of McNamee gulch, about 4 miles south of Greenhorn and 6 miles north by wagon road from Austin, a station on the Sumpter Valley railroad (narrow gauge). Elevation about 5000 feet. Located in the southeast central part of T. 10 S., R. 35 E.

There is a shaft 120 feet deep. The mine lies within an area of altered gabbro (greenstone), which intrudes the argillite series, and the veins bear some resemblance to the "chloritic subtype" of Lindgren, noted in the Iron Dyke (Homestead) deposit. At the Listen Lake mine a silicified shear zone in

the gabbro, reported to attain a width of 50 feet, has been crushed and small amounts of pyrite and chalcopyrite have been introduced along fractures. The material on the dump contains a few per cent of copper and is said to contain a fraction of an ounce of gold to the ton. Water stands within 10 feet of the surface in the shafts and the zone of oxidation is shallow.

LITTLE GEM MINE**WALDO DISTRICT****JOSEPHINE COUNTY**

The Little Gem mine, owned by D. K. Sutherland, is in the S. W. $\frac{1}{4}$ of Sec. 36, T. 39 S., R. 7 W., about 3 miles east of Holland, on the west side of Sucker creek, at elevations ranging from 2300 to 2900 feet, as measured by barometer. It is opened by several adits having a total length of more than 800 feet. The lower adits are shorter and do not disclose a vein in the greenstone country rock. The upper adits reach a quartz vein, which strikes N. 65° E. and dips about 85° S. E., which seems to finger out downward. The uppermost and longest adit was being reopened and extended in 1913. The country rock here is andesite containing abundant pale green hornblende, lath-shaped oligoclase, some nearly colorless epidote, dirty gray siderite, and greenish chlorite.

LITTLE HILL PROPERTY (gold)**WEATHERBY DISTRICT****BAKER COUNTY**

This property consists of 3 claims owned by Fish and Bowen, of Baker, and McGillery, of Weatherby. It is located about 4 miles northeast of Weatherby in about Sec. 9, T. 12 S., R. 44 E. There is a fairly good wagon road from the property to the railroad at Weatherby. The country is hilly and for the most part barren, although timber is at no great distance to the northeast.

Country rock is granodiorite, which is weathered on the surface, fresh pieces being hard to obtain. The overlying Tertiary lavas are also in evidence in this vicinity, as well as their dike feeders. The quartz vein is of the distinct fissure type, strikes S. E.-N. W. with a nearly vertical dip, and varies in width from 2 inches to 2 feet. The values are said to be well distributed, although in places there are richer streaks of high grade ore. The average value is said to be \$130 per ton in free gold.

The development work consists of several tunnels, some of which are inaccessible. There is one drift on the vein about 50 feet below the surface with a short stope to the surface. The present development work consists of sinking a shaft near the vein close to the portal of this tunnel. At a depth of 50 feet the intention is to crosscut a distance of about 10 feet to the vein. There is a small stamp mill on the property driven by an oil engine.

LITTLE MEADOWS PLACER MINING COMPANY (placer)**JOSEPHINE COUNTY**

Local name, Tennessee Bar.

Office: 31 North First St., Portland, Oregon. F. E. Myers, Pres.; R. F. Myers, Sec.-Treas. Capital stock, \$4800; par value \$50; all subscribed, issued and paid up. (1916 report).

This company has 2 claims, the "Tennessee Bar," One and Two, on Rogue river, Josephine county.

LITTLE PITTSBURG MINE (gold)**ASHLAND DISTRICT****JACKSON COUNTY**

The Little Pittsburg mine, reached by wagon road via Ashland mine, about $2\frac{1}{2}$ miles west of Ashland, is about 700 feet east of the Ruth on a parallel vein, which strikes N. 3° E. and dips about 70° E. The country rock is like that at the Ruth, but contains some mica. The vein contains some quartz and calcite. An adit said to be 150 feet long is now caved shut at the portal. The vein is also opened by an incline shaft about 50 feet deep and by a few open cuts. The shaft is at an elevation of about 3000 feet.

LOGAN, SIMMONS AND CAMERON MINE (placer)**WALDO DISTRICT****JOSEPHINE COUNTY**

The placer mine owned by Messrs. Logan, Simmons and Cameron, commonly known as the Logan placer, is under option to George M. Esterly, of Seattle, Wash. The engineer in charge of the investigations is L. A. Levensaler, of Tacoma, Wash. (See Waldo Corporation.)

The oldest workings on this property are in Carroll slough, extending for more than a mile north from near the southwest corner of Sec. 5, T. 40 S., R. 8 W. Several long ditches carry water from the higher portions of the east and west forks of the Illinois river to the placer ground. The water supply permits mining for about 8 months of the year. The placer gold here, which is generally very fine, is accompanied by some platinum, as well as a little osmium and iridium.

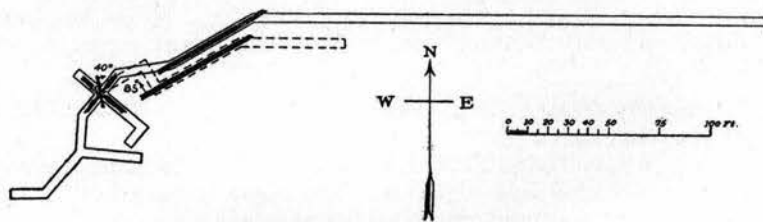
The area mined varies greatly in width, averaging nearly an eighth of a mile. The pit is from 10 to 25 feet in depth and the bedrock is conglomerate and sandstone with some serpentine. Beginning over 25 years ago, mining in this vicinity was carried on for more than 15 years. More recently several acres have been mined on French Flat, where the workings are in the southern part of Sec. 22, T. 40 S., R. 8 W. The material here mined includes a good deal of clay as well as gravel and sand. A hydraulic elevator was used to remove material from the pit, which had a maximum depth of about 15 feet, now largely filled with water. There are only a few boulders visible in the material removed, and most of them are less than 6 inches in diameter. According to Kay, the gravel in Carroll slough averaged about 12½ cents a cubic yard, and the bedrock sediments belong to the Cretaceous period. The bedrock in French Flat is a purplish conglomerate, also Cretaceous, which has been fractured, fissured, and even somewhat veined. There are 3 ditches, the water from one being used in the elevator under a head of 325 feet, that from another being employed in 2 giants, and that from the third being used to clear away the tailings from the end of the sluice at the head of the elevator.

LONG PLACER MINING COMPANY

Articles of incorporation filed in January, 1916, by W. R. Davis, Pres.; W. B. Hart, Vice-Pres., and J. R. Cheathorn, Sec. Capital stock, \$250,000.

LONE PINE MINE (gold)**UPPER APPLEGATE DISTRICT****JACKSON COUNTY**

The Lone Pine mine, 8 miles east of Applegate, is near the north line of Sec. 15, T. 38 S., R. 3 W., on Forest creek, at an elevation of 2200 to 2600 feet by barometer. It is opened by 3 adits, which are supposed to reach the same ore body. As shown in the illustration, the main entry is a crosscut adit



Lone Pine mine, main adit and one adit above

striking the vein about 250 feet from the portal. The vein strikes S. 60° W. and dips 85° N. W., but it does not seem to be continuous to the southwest, being replaced in that direction by veins of white quartz in slate in various directions. On top of the ridge at an elevation of about 2600 feet shallow workings show a vein striking S. 80° W. and dipping 80° N. in a black argillite. This mine is equipped with a Beers mill having a plate and a jig. It is owned by G. L. Huff, of Gold Hill.

LUCKY BART GROUP (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Lucky Bart group, 7 miles northwest of Gold Hill, includes 11 claims in Secs. 29 and 30, T. 35 S., R. 3 W., at elevations ranging from 2200 to 2900 feet above sea level. The chief claim was discovered about 1890 by Joseph Cox; it is now owned with the others by J. H. Beeman, of Gold Hill. According to the owner, ore has been mined from 5 veins on the group, all of them striking nearly east and west. At one of the adits about a quarter mile west of Sardine creek a vein of quartz 6 to 24 inches thick strikes east and dips about 80° N., thus being roughly parallel with the side hill here, as a "blanket vein." The country rock here is argillite and quartzite. The ore is said to be of high grade in the oxidized part of the vein. According to Kay:

The veins on the Lucky Bart group have an average width of less than 2 feet; the country rock is metamorphosed sediment, mainly slates and micaceous quartzites. The general strike of these rocks in this vicinity is somewhat east of north; the dip is to the southeast and is usually at fairly high angles. The total amount of ore that has been milled exceeds 14,000 tons, which gave values ranging from \$4.80 to \$100 a ton of free milling ore. The ore from the Lucky Bart claim carried an average of 3 per cent of sulphides, which ran from 4 to 8 ounces of gold to the ton and a like amount of silver. Nine tons of ore from the deepest workings of this claim were shipped to the Tacoma smelter and gave returns of \$130 to the ton. Practically all the ores from the group have been treated at a mill on Sardine creek. At the Yours Truly claim, where work is now being done by J. E. Kirk, the workings consist of an entrance tunnel of 75 feet to the vein, 100 feet of drifting on the vein, and a shaft of 30 feet. The country rock is a mica slate. The vein has an average width of about 1 foot and runs S. 85° W. At the end of the drift there are two veinlets of 8 inches and 4 inches in width and also a small seam. Within the workings there is evidence of considerable faulting; the directions of the fault planes observed were somewhat east of north. Mr. Kirk states that the veins carry more gold adjacent to the fault planes than elsewhere. The ores of the Yours Truly are highly oxidized and carry an average value of more than \$30 to the ton.

A small outcrop of "granite" was observed just north of the point where the Lucky Bart vein seems to cross Sardine creek in section 29.

The mine is equipped with a 5-stamp mill on Sardine creek, at an elevation of about 1900 feet above sea level. It has a boiler burning wood, a 2½ H. P. engine, a plate 4 by 11 feet, and a Johnson canvas covered table for concentration.

LUCKY BOY (TINA H.) MINE (gold) MULE CREEK DISTRICT CURRY COUNTY

This property of 2 claims is 2¼ miles from mouth of Mule creek in north-central part of T. 33 S., R. 10 W., on the west side of the west fork of Mule creek, at elevation of 1000 feet. It is owned by Chas. Tucker.

Developed by 2 tunnels (drifts) and raises. The vein varies from a few inches to 3 feet. The strike is N.E.-S. W. and dip 50 to 70° N. W. The ore minerals are free gold and a little chalcopyrite. Production has been about \$50,000. Equipped with 2-stamp mill and cyanide plant, operated by water power.

LUCKY DOG MINING COMPANY (placer) JOSEPHINE COUNTY

Local name, Welcome mine.

Office: 506 McKay Bldg., Portland, Oregon. T. J. Bernard, Pres.; Samuel Weldon, Sec., both of Portland, Oregon. Capital stock, \$45,000; par value \$10; all subscribed, issued and paid up. (1914 report).

Samuel Weldon states:

The company lost the property because the annual work was not done and the company is not now in existence.

LUCKY FOUR MINING COMPANY IDAHO

Office: Corner E. 73rd and E. Glisan Sts., Portland, Oregon. Chas. Hyle, Pres.; Henry Wingert, Sec.-Treas., both of Portland, Oregon. Capital stock, \$50,000; par value 5 cents; \$29,285 subscribed, issued and paid up. (1916 report).

This company has 4 lode claims and 1 placer claim in the Summit mining district, Shoshone county, Idaho.

LUCKY JACK MINING COMPANY (gold) ELK CREEK DISTRICT JACKSON COUNTY

Local name, Lucky Jack mine.

Office: Salem, Oregon. W. H. Burghardt, Pres.; Paul M. Sims, Sec.; Salem Bank and Trust Company, Treas., all of Salem. Capital stock, \$250,000; par value \$5.00; all subscribed, issued and paid up. (1913 report).

This company owns 5 claims 52 miles north of Medford on a branch of Elk creek, 30 miles northeast of Trail, Ore., near the Buzzard mine. This property has several hundred feet of development work.

This corporation is in the hands of the receiver and the property is now idle. Dissolved by proclamation in January, 1917.

LUCKY QUEEN MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Lucky Queen mine, 5 miles east of Hugo, is near the north line of Sec. 31, T. 34 S., R. 5 W., between Jack creek and Shorthorn gulch. It is owned by Rush Bros. A 10-stamp mill was built here in 1886, but it has since been removed. The ore is in quartz veins in argillaceous quartzite. At the face of a crosscut on the lower level the sediments strike N. 40° E. and dip 50° S. E. The auriferous veins strike and dip in about the same directions. On the lower level the main vein is cut off to the northeastward by a fault which strikes N. 70° W. and dips 65° N. E. The vein varies in thickness from about 6 to 30 inches, and the ore is said to average \$10 a ton in gold. The mine has been idle for many years, but 2 of the adits are still in good condition.

LUCKY SEVEN MINING COMPANY WALDO DISTRICT JOSEPHINE COUNTY

Office: Grants Pass. Richard Smith, Holland, Oregon, Pres.; Edward H. Richard, Grants Pass, Sec.; Inez Murphy, Grants Pass, Treas. Capital stock, \$6000; par value \$1000; all subscribed, issued and paid up. (1914 report).

According to information given by the secretary of this company, the prospect was recently abandoned and relocated by 6 individuals. It is located about 10 miles south of Holland near the California line.

A 100-foot crosscut tunnel has been driven during the past year.

LUCKY TOVELL (copper) GREENBACK DISTRICT JACKSON COUNTY

This mine is located in Sec. 28, T. 33 S., R. 4 W., about 16 miles from Leland up Grave creek. This property has only a small amount of development work, which shows small masses of copper sulphide in serpentine somewhat similar in general nature and association with the country rock at the Queen of Bronze in the Waldo district. A small shipment of copper ore was made from this mine in 1915.

**LUCKY WARREN PROSPECT (molybdenum)
CHETCO (MOUNT EMILY) DISTRICT CURRY COUNTY**

This deposit is owned by Mr. Charles M. Warren, and is situated a short distance south of the crest of Mount Emily. The deposit is similar in nature to that on the Florence claim, but the mineralized streak is narrower, and the interstices between the fragments of hornfels contain molybdenite. A sample across the whole ore body yielded on analysis 3.10 per cent molybdenum.

Another peculiarity of this deposit is the presence of considerable hornblende, which was not seen in the Florence prospect. The mineralized streak is said to yield high gold values when panned, but a sample proved, when assayed, to contain not a trace of gold.

LYTLE MINE (copper) WALDO DISTRICT JOSEPHINE COUNTY

The Lytle mine is located on the east slope of a small spur of Elder peak, in the S. W. ¼ of Sec. 1, T. 41 S., R. 8 W., 2 miles southeast of Takilma. It is

controlled by the Tutt estate, Colorado Springs, Colo. At present it is under option to John Hampshire, of Grants Pass, and the Twohy Bros., of Portland. This mine is similar to the Queen of Bronze in the character of its ores, their modes of occurrence and associations, which see for description.

MABLE MINE (copper)**WALDO DISTRICT****JOSEPHINE COUNTY**

The Mable mine, or Copper King, is located on Page creek south of the N. E. corner of Sec. 11, T. 41 S., R. 8 W., $2\frac{1}{2}$ miles southeast of Takilma. It is controlled by the Tutt estate, Colorado Springs, Colo. At present it is under option to John Hampshire, of Grants Pass, and the Twohy Bros., of Portland. This mine is similar to the Queen of Bronze in the character of its ores, their modes of occurrence and associations, which see for description.

MACDOUGALL GROUP (copper)**HOMESTEAD DISTRICT****BAKER COUNTY, WALLOWA COUNTY**

Nineteen of the 40 claims owned by W. B. MacDougall are patented claims. They are located about 5 miles north of Homestead, $\frac{1}{2}$ to a mile from the river and up to 2500 feet above it. The region consists of a greenstone series, which is made up of altered dense porphyritic and amygdaloidal flows with interbedded breccias and tuffs and possibly some intercalated sheets and sills. Considerable shattering has taken place; in fact, the principal mineralization is in brecciation zones. The observed porphyritic and amygdaloidal flows are andesite, while the breccia is made up of the angular fragments of various types of lavas held in a dense groundmass of ferruginous material, in which there has been quite a development of secondary calcite.

The different types under the microscope show that these greenstones have been extensively shattered with the subsequent development of calcite, epidote and quartz in gash veins. Some of these veins contain small amounts of pyrite and chalcopryrite. Occurring in this way, it indicates that these materials are the result of lateral secretion processes.

The principal mineralization is in brecciated steep dipping N.-S. shear zones. Three of these zones were observed and there is said to be four others beyond. Although no surface crosscuts have been made to determine the width, they are said to be from 30 to 200 or more feet wide.

In these shear zones occur various sized stringers of quartz, calcite and chalcopryrite. In some places stringers of chalcocite more than an inch wide are found. These stringers of chalcocite are intimately mixed with a lesser amount of quartz. In some places the country rock on each side of the stringers is impregnated with chalcocite for several inches. At the immediate surface the chalcocite is partially altered to malachite with some azurite, but even there the alteration is quite incomplete and three or four feet below the green and blue colorings of the copper carbonates are nearly absent.

A very important undetermined question is the primary or secondary nature of the chalcocite. If it is primary the same type and degree of mineralization might well be expected to continue far downward in the sheared zones. If it is secondary the chalcocite at shallow depths would cease and much smaller percentages of copper in chalcopryrite mingled with pyrite would be found as the primary ore below the shallow secondary chalcocite.

Some of the chalcocite, as before stated, is intimately mixed with quartz and is apparently a primary mineral. On the other hand, on the surface of one of the upper zones a boulder was broken open, which contained crystals of chalcopryrite, which are being replaced by chalcocite. This boulder has been shattered somewhat and contains chalcopryrite as scattered grains and also associated with quartz and epidote. Some of these grains have been altered to malachite.

In from the portal of the lowest crosscut tunnel 500 feet, but said to be 300 feet away from the first shear zone, is found a rock with a few amygdules

filled with calcite and a small amount of chlorite along their borders. This rock is cut by numerous calcite veinlets, some of these containing chlorite and a small amount of chalcopryrite. The calcite in the amygdules is pink, while that in the gash veins is white.

The fracturing came later than the filling of the amygdules, since these veins cut the latter without faulting. In this rock the small amount of chalcopryrite is primary. The chalcopryrite in the boulder mentioned above is primary, but the sooty chalcocite there replacing it is secondary.

When the lower tunnel reaches the shear zones several hundred feet below their outcrops, will it find primary chalcopryrite or primary chalcocite? The evidence would lead one to hope that chalcocite will be found.

The shear zones were probably created at about the same time as the vein forming period elsewhere in eastern Oregon. This was probably after the lateral secretion processes had largely completed their widespread alteration and deposition, as evidenced in the lower 500-foot tunnel. The quartz and chalcocite in these shear zones are apt to be the product of ascending thermal solutions. If this be the case, the chalcocite, in conformity with its appearance and its intimate association with quartz, is probably primary and, therefore, will be the copper mineral to be found at depth within the shear zones.

These claims cover steep to gently rolling hills in which at various points there are many open cuts and pits, numerous short tunnels and three long ones, approximately 200, 300 and 500 feet, respectively. The open cuts have in nearly every case disclosed copper in stringers which have been followed. No open cuts cross the shear zones at points most favorable to expose possible wide disseminations. These could have been made quite cheaply and would have exhibited the width of the shearing, whether the fractures are closely spaced or too widely separated, and whether there might be at some points ore sufficiently rich to ship. After the open crosscuts have been made conclusions could be drawn as to whether the chalcocite is sufficiently disseminated to make low grade ore throughout, or whether there is higher grade but more limited bodies of ore.

If favorable results were secured by the crosscuts, keystone or diamond drilling could be first done at the most favorable points which, if promising, could be followed by systematic arrangement of the drill holes so as to determine the limits of the ore bodies. Should wide zones of low grade primary chalcocite be disclosed, its proximity to the railroad, to water and water power, the favorable climate, and absence of overburden or leached zone requiring stripping, would permit as low grade of ore to be profitably mined as at any of the porphyry coppers now successfully operated.

In 1916 several engineers visited this property to determine whether they should recommend it to their principals for development, but up to late in the year none of them have had the courage to make such recommendations without the nature and value of the deposit having been proven at depth.

In addition to the deposits of copper glance upon this property, there are native copper-bearing outcrops. All of these native copper outcrops are in a certain type of Triassic lavas by the general name greenstone, which in the nature of the rock and in the occurrence of the copper in the rock, are essentially like that of the amygdaloid copper ores of northern Michigan. It is almost impossible to sample the croppings which involve a few acres, so that a statement can be made as to its assay value, but after examining several hundred pieces broken with sledges on the surface, followed by an assay of many representative pieces and sacks of samples, it is thought that it will exceed 1 per cent of copper in value. This outcrop has no underground development.

MADDEN MINE (placer)

SIXES RIVER DISTRICT

CURRY COUNTY

See "Blanco Mine."

MAGNOLIA MINE (gold)**GRANITE DISTRICT****GRANT COUNTY**

Comparing the present condition of this mine with the description given by Lindgren in 1900, it appears that the only work since then has been the extension of the lower tunnel about 200 feet. According to reports, the last important work was done in 1904. The tunnels extend northeast along the vein from Lucas gulch, a tributary of Granite creek, about 5 miles north of Granite. A small production is reported.

The vein strikes N. 50° E. and dips 65° southeast, 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 per cent 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.

The property was reported in 1916 as sold by Boyce and Lachner to the Goddard-Hayes Mines Company, who were expected to begin the development and equipment of the mine some time during the fall.

MAID OF THE MIST MINE (gold) UPPER APPLGATE DIST. JACKSON COUNTY

The Maid of the Mist mine, reached by wagon road 5 miles south of Applegate, up Thompson creek, is in the south half of Sec. 4, T. 39 S., R. 4 W., on a branch of Thompson creek. The country rock is greenstone, in which there are several auriferous quartz veins, the most important striking east and dipping about 55° S. It is opened by a shaft 200 feet deep and about 500 feet of other workings, now full of water. It has not been in operation for several years. According to Kay:

The values are irregularly distributed through the quartz, which is fairly free from sulphides. Of the latter, arsenopyrite appears to be more prevalent than pyrite. Calcite is subordinate.

MAMMOTH MINING COMPANY (gold) CRACKER CREEK DIST. BAKER COUNTY

Local name, Mammoth mine.

Office: Board of Trade Bldg., Portland, Oregon. W. W. Wheelock, Pres.; F. J. Newey, Sec., Marquette Bldg., Chicago, Ill. Capital stock, \$50,000; par value \$100; all subscribed, issued and paid up. (1914 report).

Property consists of Red Fox and Belle of Baker quartz claims, located in Sec. 35, T. 8 S., R. 36 E., at an elevation of 6400 feet, and is reached by wagon road via Cracker creek from Sumpter, a station on the Sumpter Valley railroad (narrow gauge), distance 10 miles.

The Mammoth mine, although upon the McCully fork side of the divide, between that stream and Silver creek, is reached by a branch wagon road from Silver creek. This property, purchased from the Bald Mountain Mining Company by the Mammoth Mining Company a few years ago, was closed down late in 1914, after having been operated by the purchasers largely through a system of leasing since the time of purchase.

The country rock is granodiorite and argillite, but the vein is not a contact vein, since the plane of the vein locally cuts both. There are two shoots of ore upon the property, one upon the Mammoth and the other upon the Belle of Baker claim. Little has been done upon the former for 12 years, the work

having been confined largely to the latter since the discovery of rich ore there in 1900. It is here developed by a shaft and four levels. There are two shoots of ore about 50 feet apart, one with a stope length of 150 feet and the other 100 feet. These shoots go down to the 300-foot level, but wedge out above the 400-foot level.

The good ore follows along the foot of a black gouge streak near, but not on the hanging wall of the vein. The hanging and much of the footwall is granodiorite. The vein is from 4 to 30 feet wide. It has been stoped from 2 to 20 feet wide. Assay values range from \$2.50 to \$10,000 per ton. The large stope averaged \$5 to \$6 a ton.

The vein material consists of sheared argillite and short silicified lenses, in which much of the argillite has been replaced, alternating with irregularly located streaks of gouge.

The ore minerals, pyrite and arsenopyrite in small percentages make up the concentrates, while rich ore in the vein is usually wire gold associated with roscoelite.

The work in the last 2 or 3 years has been confined to the upper levels, especially in following a narrow streak, in which pockets of high grade ore were occasionally found.

This mine is reported to have been the property of A. Bodelson, who was operating it at the time it closed down late in 1914 on account of financial difficulties; it is said to have passed into the hands of the First National Bank of Sumpter, and from it to the Citizens National Bank of Baker. Not much has been done upon the property since 1914.

MANUEL LOPEZ CLAIMS (copper) WALLOWA DISTRICT WALLOWA COUNTY

Located in about Sec. 18, T. 4 S., R. 45 E., on the west fork of the Wallowa river, about 10 miles south of Joseph, the railroad terminus. There is a wagon road for 5 miles and an indifferent trail for 5 miles. The ore is a contact-metamorphic between limestone and intrusive granodiorite. The contact has a high angle of dip and shows a small amount of mineralization with epidote and chalcopyrite as chief minerals. Development consists of a short adit and a few surface cuts. Property is not active.

MARTHA MINE (gold) GREENBACK DISTRICT JOSEPHINE COUNTY

The Martha mine is in the S. W. $\frac{1}{4}$ Sec. 28, T. 33 S., R. 5 W., about 1 mile north of the Greenback mine. It is $2\frac{1}{2}$ miles north of the town of Placer, which is 8 miles west of Leland, the nearest railroad point. It is on the steep western slope of St. Peter mountain overlooking Coyote creek. It is opened by 4 adits at different elevations, having a total length of about 3000 feet. It was opened as a separate mine, but in 1904 it was purchased by the Greenback company and developed more fully by means of electric power from the Greenback mine. In 1906 the Martha was connected with the Greenback mill by means of an aerial tramway. After the Greenback mine was closed the Martha was leased to J. M. Clarke, of Golden, Oregon, who erected a 5-stamp mill on the ground and treated ore previously developed and partly mined. The country rock is greenstone and the ore is similar to that of the Greenback, though not as rich. It occurs in veins and stringers in zones of shearing. In adit 2 the chief vein strikes N. 70° W. and dips at an angle of 55 to 60°; it varies in width from a few inches to about 4 feet with an average of about 2 feet for the first 600 feet; the adit beyond was not accessible; it was said to extend 800 feet. At about 350 feet from the portal a fault which strikes about N. 60° W. causes an offset of about 15 feet toward the north.

This mine is at present owned by R. C. Robinson of Parish, New York.

MARVIN MINE (copper) GALICE DISTRICT JOSEPHINE COUNTY

The Marvin mine is near the top of Peavine mountain at an elevation of 3400 feet, as measured by barometer. A lode 30 feet wide, containing some

quartz with chalcopyrite in pyroxenite somewhat altered to chlorite and serpentine, is opened by an adit which extends N. 40° W. about 150 feet. The lode strikes north of east and dips about 45° S.

MASHELL COAL AND COKE COMPANY

WASHINGTON

Office: Third and Washington Sts., Portland, Oregon. Edward Cookingham, Portland, Pres.; R. S. Howard, Portland, Sec.; Albert Cookingham, Tacoma, Wash., Treas. Capital stock, \$100,000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company's properties are located in Pierce county, Washington.

MASTODON HYDRAULIC MINING COMPANY

ALASKA

Office: 503 Platt Bldg., Portland, Oregon. W. G. McPherson, 198 Wilson St., Portland, Pres.; Sanderson Reed, 503 Platt Bldg., Portland, Sec. Capital stock, \$100,000; par value \$100; all subscribed, issued and paid up. (1916 report).

The properties of this company are situated on Mastodon creek, Alaska, and the postoffice is Miller House.

MATTERN MINE

ASHLAND DISTRICT

JACKSON COUNTY

An adit known as the Mattern is near the Ashland mine on the west side of the ridge and about 3 miles by wagon road west of Ashland. The adit extends about 370 feet in a direct line about S. 20° W., all the way on a vein which dips about 40° E. Where observed the east or hanging wall is tonalite and west or footwall is a dark colored diorite.

At the north end of the ridge between Wagner and Ashland creeks and only about a mile northwest of Ashland is another adit called the Mattern. This has a total length of about 325 feet and a general southerly course. At about 50 feet from the portal it reaches the ledge, which strikes nearly north and dips about 40° E. The ledge follows an important fault in which the country rock is much shattered and altered and cemented by calcite and quartz. The wall rock of the ledge is a diorite-aplite or malchite. At about 275 feet from the portal a chute extends upward into a stope and at about 230 feet from the portal an incline winze follows the vein downward; it could not be explored, because it was filled with water.

MAXWELL MINE (gold)

ROCK CREEK DISTRICT

BAKER COUNTY

This property adjoins the Highland mine in Sec. 19, T. 8 S., R. 38 E. The workings are indicated by a number of dumps extending over a vertical range of 1200 feet, along a narrow ravine at the head of Maxwell basin, which is formed by the junction of two glacial valleys that head against a prominent northward spur from Elkhorn ridge. The most important operations extended over the period from 1900 to 1905, and though there has been no production since 1905, a little work is reported to have been done as late as 1909. The mine is said to have been sold for \$123,000 in 1901.

It is now being operated by Delbert E. Metzger, who keeps a small development force at work in this and the Highland, which he acquired by bond and lease in the summer of 1916. The developments comprise 18 tunnels and short drifts reported to aggregate 6000 feet. The lowest, No. 18, and No. 10, 900 feet higher, were open in 1914, though the sources of ore in the former were not accessible. An aerial tram connects tunnel No. 10 with a mill, now dismantled, in the basin below.

According to J. K. Romig, a former manager, an intermediate tunnel, No. 14, contained the most extensive workings. In this two ore shoots were developed on a vein in argillite, an outer one 250 feet long attaining a maximum width of 4½ feet, and an inner one 80 feet long, with a maximum width of 6 feet. The oxidized zone was extremely shallow. The material now to be

found on the dumps of the lower tunnels contains a high per cent of pyrite, arsenopyrite, blende and galena, named in order of abundance. In addition to quartz, the gangue minerals are calcite, siderite and fuchsite. In structure this type of ore resembles that found in the Highland vein, which lies a short distance to the northwest. It is reported that though much of this class of ore contains a fair amount of gold and silver, it is not amenable to treatment by concentration, because of the high proportion of sulphide minerals.

Tunnel No. 10, 290 feet long, and several above it that are now caved, explore a vein different in character, though lying along the extension of the lower group of tunnels. The vein is a breccia zone, in part in granodiorite and in part along its contact with argillite attains a maximum width of 3 feet, and has been stoped over an area 130 feet long by 80 feet high to the outcrop. In contrast with the average strike of about N. 60° E. of the lower Maxwell vein, this vein strikes N. 30° E., and the dip is 80° S. E. The ore occurs as lenses showing angular nuclear masses of fine pyrite, sericite and fuchsite in dense quartz. These nuclei are enveloped in a zone of radial quartz crystals, with here and there a coarse pyrite crystal. If arsenopyrite is present, it was not observed. The vugs between these nuclear masses contain calcite crystals. In addition to the quartzose lenses, the vein contains zones of sericitic gouge. This general structure is characteristic of many veins in the district, but this is the only one seen in granodiorite that showed it. A small amount of manganese oxide occurs in the oxidized ore. Assays as high as \$35 a ton in gold are reported, the ratio of silver to gold seldom exceeding 2 to 1 by weight.

MAY BELLE CLAIM GOLD HILL DISTRICT JACKSON COUNTY

For description see "Blanche Claim."

MAYFLOWER GROUP (gold) GALICE DISTRICT JOSEPHINE COUNTY

The Mayflower group is on the south fork of Rocky gulch at an elevation of about 2800 feet, about 1½ miles west of the Oriole mine. It is a group of 3 claims located in 1910 and now owned by Robertson and Sutherland. The garnetiferous mica schist here strikes N. 10° E. and locally dips only 35° E. An adit in chloritic serpentine discloses many small lenses and stringers of quartz. Other small openings are on a fault, east of which is a hard banded rock, succeeded westward by 3 feet of radiating light green amphibole, platy serpentine and fault gouge. West of the fault is massive gray talc (?), followed by black chloritic serpentine. The general strike of the rock formations on Peavine mountain is N. 15 to 20° W., with a steep dip to the east. The banded rocks include quartzite, quartz mica schist, fine and coarse amphibole schist and graphitic mica schist. The Mayflower group is equipped with a Chilean quartz mill run by a Pelton wheel. Diller states that:

The gold is free or is in the pyrite, and chiefly, if not wholly, in the rotten quartz of the greenstone schist adjoining the contact. There is little, if any, gold in the white quartz. A small amount of chalcopyrite is present.

MAYFLOWER MINE (gold) CORNUCOPIA DISTRICT BAKER COUNTY

The mill and cyanide plant is located about ¼ mile south from the Union-Companion mill (see Cornucopia Mines Company), and receives its ores from the mine by an aerial tram from a considerably higher elevation.

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

The vein here is smaller than at the Last Chance mine, being at the widest place not over 3 or 4 feet and in many places pinching out entirely. There is evidence in the walls that they have been subjected to a great deal of pressure, but there are no signs here of any great movement. This mine is devel-

oped with 2 adit levels and 1 intermediate. A raise in the vein 530 feet to the surface connects the several workings.

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

It is understood that this property, which had labor and material liens filed against it following the shut-down in 1914, has been purchased by the Queen of the West Mines Company, but the property is inactive.

MAYFLOWER MINE (gold) SUSANVILLE DISTRICT GRANT COUNTY

This mining prospect, which is on the same side of Elk creek as the Badger mine and not far from it, is inactive.

MAY QUEEN MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The May Queen mine, 5 miles southeast of Grants Pass, is on the east slope of Baldy mountain in Secs. 26 and 27, T. 36 S., R. 5 W., on the west side of Green creek, at an elevation of about 1500 feet, as measured by barometer. It is owned by N. C. Boynton. The country rock is a hard, dense greenstone, in which the vein strikes N. 55° W. and dips 30° N. E. A drift on the vein extends 280 feet to the northwest; about 100 feet from the breast a raise on the vein extends 125 feet to the surface. Some ore was stoped out near the raise. There are no very distinct walls or fault gouge; the vein quartz varies from a mere stringer to a foot in width. At the southern end the vein seems to fork into 2 smaller veins. The mine is equipped with a small 2-stamp mill run by a gasoline engine.

MCCARTHY CLAIMS (copper) HOMESTEAD DISTRICT BAKER COUNTY

The McCarthy property, situated about 1 mile north from Homestead, in Sec. 16, T. 6 S., R. 48 E., has chalcopryite in a vein a few feet wide, but work has been interfered with by a basalt dike, which has discouraged development.

McGEE'S CLAIMS EAGLE CREEK DISTRICT BAKER COUNTY

See "Sheep Rock Mine."

McLEMORE AND HAMPSON'S CLAIMS (gold) GOLD HILL DIST. JACKSON COUNTY

McLemore and Hampson's claims, 7 miles southwest of Gold Hill, are in the S. E. ¼ Sec. 7, T. 37 S., R. 3 W., on the left fork of Footh creek; they report a vein of quartz 6 to 16 inches wide carrying free gold, pyrite, pyrolusite and galena.

McMAHON'S CLAIM (gold) GOLD HILL DISTRICT JACKSON COUNTY

McMahon's claim, about 6 miles southwest of Gold Hill, is in the N. W. ¼ S. W. ¼ Sec. 6, T. 37 S., R. 3 W., on the left fork of Footh creek, at an elevation of 1850 feet by barometer. Here a quartz vein about 18 inches wide strikes N. 55° W. and dips about 40° N. E., the dip increasing somewhat with depth. It is opened by an incline shaft about 75 feet deep, and a drift running S. 55° E. about 50 feet ending in a winze 30 feet deep.

McPHERSON PROSPECT ILLINOIS RIVER DISTRICT JOSEPHINE COUNTY

See "Winters and McPherson" prospects.

MEEK'S (ECKIS) MINE (placer) PORT ORFORD DISTRICT CURRY COUNTY

Diller describes this mine as follows:

On the Meeks mine, near Port Orford, Mr. R. G. Eckis has been running an Eccleston Tension Concentrator 24 hours a day for some time. He is using a giant to wash the sand into a sluice box in the bottom of which he has the screen, thus taking the heavy black sand out in an undercurrent. This product is then run over the concentrator. He reports that he is securing 80 per cent of the gold, platinum, and iridosmine, and he

says his concentrates run over \$8000 a ton total value. One machine handles the undercurrent from 150 cubic yards a day.

Mr. Diller does not say whether the Meek's mine is on the present ocean beach or one of the old high beaches.

MERGER GOLD MINING COMPANY BLUE RIVER DISTRICT LANE COUNTY

Office: 67 N. Third St., Portland. S. M. Carter, Pres., Blue River; F. W. Brooke, Sec.; C. Marco, Treas., both of Portland. Capital stock, \$250,000; par value \$1.00; all stock subscribed, issued and paid up. (1916 report).

Property consists of 6 claims, located in northern part of Sec. 4, T. 16 S., R. 4 E., about $4\frac{1}{2}$ miles from Blue River, a postoffice 45 miles east of Eugene, on the McKenzie river. The wagon road to the Blue River postoffice from the mine is in fair condition, and the road from Blue River to Eugene is in good shape. The country is rugged and plenty of timber is available.

The country rock is andesite. Deposit is of the brecciated zone type, having N. W.-S. E. strike, dipping at a high angle. It is said to be an extension of the Lucky Boy vein. Development work consists of several tunnels, but the lowest tunnel has not yet reached the vein.

No information in regard to values, etc., was available.

MIDWAY OIL COMPANY

Office: 302 Concord Bldg., Portland, Oregon. Chas. E. Ladd, Pres.; A. E. Davis, Sec., both of Portland, Oregon. Capital stock, \$1,000,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

MILLER GROUP CHINA DIGGINGS DISTRICT CURRY COUNTY

See "Bacon & Miller Groups."

MILLIONAIRE MINE (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Millionaire mine, 4 miles east of Gold Hill, is in S. W. $\frac{1}{4}$ Sec. 30, T. 36 S., R. 2 W., on nearly level ground, at an elevation of 1730 feet, as measured by aneroid barometer. It is opened by 2 vertical shafts, the deeper one said to be 400 feet deep, with levels opened a short distance each way at each 100 feet. The vein strikes E. and dips about 60° N.; there are 3 veins reported to be nearly parallel, all 4 containing quartz with pyrite and rare galena and chalcopyrite. Two more veins are said to strike north and dip east; these contain calcite, quartz, pyrite and a mineral resembling sylvanite. The country rock consists of dark argillite with bands of andesitic material. The other shaft (called the Johnson) is probably on the same vein; it is 120 feet deep and has a crosscut to the vein at a depth of 30 feet. Here the vein contains 2 to 3 feet of quartz with some fault gouge and a little manganese. It strikes S. 72° E. and dips 85° N., but it is stepped north going down so as to give a smaller apparent dip (about 60°). About 600 feet along the strike of the formation (N. 20° E.) there is a small outcrop of limestone and an old kiln. A fragment of limestone was found on the Johnson shaft dump. The Siskiyou tonalite outcrops about a mile to the northward, and may extend under this region.

The Millionaire mine is owned by the McKeen National Bank, of Terre Haute, Ind. It is equipped with a mill which has never been operated, although substantially complete and in good condition. The mill has 2 Nissen 1500-pound stamps with circular discharge and 2 10-foot amalgamating plates; it has a rock crusher and a Standard concentrating table. The mine has been idle for several years.

**MINNEHAHA GOLD HYDRAULIC AND DREDGE COMPANY (placer)
GREENBACK DISTRICT JOSEPHINE COUNTY**

Office: Portland, Oregon. A. R. Tozier, 365 Morrison St., Portland, Pres.; J. P. Kennedy, 680 Flanders St., Portland, Sec.; J. E. Fallas, 365 Morrison

St., Portland, Treas. Capital stock, \$500,000; par value \$1.00; \$296,000 subscribed and paid up, \$204,000 issued. (1913 report.)

This company owns placer claims near Wolf creek in Josephine county. The property has been idle for several years. Dissolved by proclamation in January, 1917.

MOLLIE GIBSON GOLD MINING AND MILLING COMPANY (gold and copper)
CABLE COVE DISTRICT GRANT COUNTY

Local name: "Mollie Gibson."

Office: Bourne, Oregon. T. V. Williams, New Castle, Penn., Pres.; Mrs. Jane Evans, Monmouth, Oregon, Sec.-Treas. Capital stock, \$100,000; par value, \$10.00; stock subscribed, \$85,290; stock issued, \$82,960; stock paid up, \$83,280. (1916 report.)

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.

MONITOR MINE (gold) SUSANVILLE DISTRICT GRANT COUNTY

This prospect is near the Badger mine and is said to contain considerable high grade shipping ore as well as bodies of good milling ore.

MONUMENTAL MINE (gold-silver) GRANITE DISTRICT GRANT COUNTY

This mine is located on the northwestern slope of Bald mountain in Sec. 19, T. 8 S., R. 36 E. about 9 miles by wagon road from Granite. 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.

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.

MOON ANCHOR MINES COMPANY (gold) CABLE COVE DIST. GRANT COUNTY

Local name: "Moon Anchor."

Office: 324 Henry Bldg., Portland, Oregon, Mike Zenger, 681 First St., Portland, Pres.; Anthony Mohr, 324 Henry Bldg., Portland, Sec.; Frank Degonda, 232 Front St., Portland, Treas. Capital stock, \$100,000; par value \$1.00; stock subscribed, issued and paid up \$62,235. (1916 report.)

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.

MOOD MINE (gold) ILLINOIS RIVER DISTRICT JOSEPHINE COUNTY

Concerning this mine Diller says:

Near the forks of Fiddlers gulch, about 7 miles nearly west of Kerby, are situated the 6 claims of the Mood mine. Like most of the lode mines of that region, this mine is in the vicinity of the western border of the great serpentine belt. It is said that the mine has nearly 2000 feet of underground workings and an old arrastre in which ore was ground that yielded some thousands of dollars. Tunnels are being run to the northeast along a shear zone approximately parallel to the contact. There is a small but distinct gouge, some irregular veins of quartz, and a lense of very hard rock rich in pyrite.

In the same vicinity, but farther west, between the forks and along the main branch of Fiddlers gulch, there are a number of openings that were not seen, among them those of Watson and Andrews. The greenstone is in places full of pyrite, but its value has not been proved.

MORNING MINE (gold) GREENHORN DISTRICT GRANT COUNTY

The Morning mine in Sec. 13, T. 10, 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 is 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 small 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 re-grinding purposes. Amalgamation recovered a few dollars per ton and concentration on revolving canvass 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.

MORRIS MINE (silver-gold)**GREENHORN DISTRICT****GRANT COUNTY**

These claims are about $1\frac{1}{2}$ miles southeast of the Ben Harrison mine in Sec. 1, T. 10 R. 34 E. They have been located at least 20 years and have had considerable sorted silver ore shipped from them from time to time.

The country rock is granodiorite, although argillite and limestone are found in the immediate vicinity. In fact the veins are almost on the contact of the intrusive with the sediments. There are four nearly parallel N.-S. veins with vertical dip which are branch veins of a larger one of moderate width which strikes S. 35° W. The N.-S. veins are narrow, rarely as much as a foot in width, but the wall rock shows considerable alteration.

The minerals found in these small veins are silver sulphides, some tetrahedrite, stibnite, pyrite, and arsenopyrite, and at some points silver chloride.

The large vein, 3 or 4 feet wide, seems to consist of quartz, massive pyrite, and arsenopyrite. It is said to have moderate values in gold and silver. It has one drift upon it for a couple of hundred feet.

The ore which has been sorted and shipped at various times since the discovery has all come from the narrow veins. To indicate the proportions of gold and silver the mint of 1891 credits the Morris with a production of \$15,000 in silver and \$3,400 in gold. During 1913-14 the few shipments made from the property averaged about \$50 per ton.

MORRISON SMITH MINING COMPANY

Last report to Corporation Department made in 1913.

MOSES AND COLLINS CLAIMS (gold)**UPPER APPLGATE DISTRICT****JACKSON COUNTY**

Moses and Collins have gold prospects in quartz veins in greenstone on Collins mountain in Sec. 35, T. 40 S., R. 4 W., 28 miles southwest of Jacksonville on the Applegate river. Most of the veins are small and rather irregular; one of the largest is 1 to 3 feet thick and contains streaks of pyrolusite. The ore is a surface concentration occurring in rich bunches at or very near the surface.

MOSS ROSE GROUP**ELK RIVER DISTRICT****CURRY COUNTY**

See "Axtell Mine."

MOUNTAIN GEM MINING AND DEVELOPMENT COMPANY

(copper, gold and molybdenite)

WALLOWA DISTRICT**WALLOWA COUNTY**

Local name: "Gem Mine."

Office: Joseph, Oregon. Harry Dawson, Pres.; T. F. Tomkins, Sec.-Treas., both of Joseph, Oregon. Capital stock, \$200,000; par value, ten cents; \$124,211.20 subscribed and issued and \$123,711.20 paid up. (1916 report.)

The company owns 11 claims on the west fork of Wallowa river in Sec. 31 T. 3 S., R. 45 E., up a side gulch to the west and within 3 miles of Wallowa lake about $\frac{1}{2}$ mile away from the main stream and 10 miles from Joseph by wagon road. The company also has 5 claims 25 miles south of Lostine. The elevation is approximately 6000 feet at the principal contact of the granodiorite with limestone and calcareous schists.

Pegmatite and aplite dikes are present. The aplite dikes for the most part are small ones in the granodiorite, while a pegmatite dike, consisting chiefly of quartz and feldspar, is about 10 feet wide.

The characteristic contact-metamorphic minerals, such as garnet, epidote, quartz, calcite, pyrite, chalcopyrite, molybenite and magnetite are found. The molybdenite is associated with pyrite, with quartz, epidote and calcite as a gangue. The magnetite is associated with quartz, and pyrite with a small amount of epidote.

A short crosscut tunnel has been driven diagonally toward the contact in granodiorite, but has not reached it, but has cut through an irregular

bunch of fine-grained pyrite, chalcopyrite, quartz, garnet and epidote about 5 feet wide.

The production in 1915 was 14 tons, valued at \$426.40.

MOUNTAIN KING MINE (mercury) GOLD HILL DISTRICT JACKSON COUNTY

The Mountain King mine owned by J. R. Hayes of Detroit is in Sec. 36 (and neighboring secs.) T. 34 S., R. 3 W., 18 miles northeast of Woodville on the Southern Pacific Railway or 12 miles northeast of Gold Hill. The property consists of 800 acres of patented land.

It occurs along a granite-sandstone contact where the granite is in part represented by pegmatite. Native mercury is seen in calcite at an elevation of 2500 feet as measured by aneroid barometer in an open cut near the main adit (No. 1). In the latter there is no well-defined vein but some mineralization along an irregular contact. The ore contains cinnabar, native mercury, pyrite, and a heavy black mineral resembling metacinnabarite. The same contact (with some cinnabar) is visible also at an open cut up the hill N. 70° E. and 140 feet higher than adit 1. In another entry about 100 feet lower than the main adit native mercury is abundant in a much decomposed granite in the floor where the adit forks about 20 feet from the portal. The granite also contains a little cinnabar. The adit extends S. 11° E. 170 feet, the last 90 feet in solid micaceous quartzite; a branch tunnel extends irregularly south about 30° E. 75 feet. Except in the solid quartzite much faulting is in evidence in all directions.

Considerable development has been done on the property during the past summer, all work tending to show larger ore body.

MOUNTAIN LION MINE (gold) LOWER APPLGATE DIST. JOSEPHINE COUNTY

The Mountain Lion mine is 12 miles southeast of Grants Pass and 1 mile north of Davidson in Sec. 25 T. 37 S., R. 5 W. It is owned by L. L. Jewell, of Grants Pass, and is under bond and lease to C. G. Murphy, of Applegate.

When visited in August, 1913, the main adit was caved and could not be seen; the upper adit (No. 2) is about 500 feet long, with more than 300 feet on the vein which is 4 to 36 inches wide with 0 to 24 inches of quartz and the remainder crushed greenstone. A sample of the country rock contains rare phenocrysts of augite in a matrix of abundant green hornblende (altering to serpentine) and plagioclase, almost wholly sericitized with the production of some secondary calcite and quartz. The main adit is said to be more than 1200 feet long with the ore stoped out above.

The Mountain Lion mine is equipped with a boiler, engine, air compressor, and a 5-stamp mill having 900-pound stamps, a crusher, an 8-foot plate with riffles below, and a concentrator. Adolf Meyer experimented here with a magneto-electric process which is no longer in use. According to Kay,

The property has been extensively developed, there being about 8000 feet of crosscuts, drifts and other workings. Work has been done on two veins which are in greenstone and slates and which are close to the contact of these rocks within an area of granodiorite. The slates occur as narrow lenses in the greenstones and the best ore of the veins has been obtained near the contacts of the greenstones and the slates. The better-defined vein of the two strikes N. 80° W. and dips 65° S. It averages about 1 foot in width and is faulted at many places. The vein filling consists chiefly of quartz, calcite, and sulphides, the sulphides constituting about 1 per cent of the whole. Owing to the prevalence of faults the vein has been difficult to follow.

The mine has been idle during the last few years.

**MOUNTAIN TREASURE MINING COMPANY
GRANTS PASS DISTRICT JOSEPHINE COUNTY**

About 1908, the Mountain Treasure Mining Company (dissolved Jan. 1, 1915) put in a 2800-foot pipe line to develop power to open their mine which is in Sec. 34 or 35, T. 34 S., R. 5 W., north of Jump-off Joe creek and 8 miles

east of Hugo. Apparently only an overshot wheel was installed, and an arrastre built. The underground development accomplished by the company was not seen by the writer. No work has been done for some years.

MOUNTAIN VIEW MINE (gold-silver) CRACKER CREEK DISTRICT BAKER COUNTY

This mine, situated at the head of Sardine gulch, $2\frac{1}{2}$ miles due north of Bourne, in Sec. 17 T. 8 S., R. 37 E., was not open in 1914. Its period of productive activity extended from 1903 to the end of 1907, when its mill was destroyed by fire. The vein occupies a fissure that strikes northeastward in granodiorite and the severely metamorphosed argillite along its border. According to reports, the mine was profitable during the period of its operation and produced a large sum in gold and silver. It is said that its principal ore shoot was worked over a stope length of 200 feet and pitch length of 300 feet or more, and that at the time the mine closed down ore was exposed for 80 feet along the lowest level. Partial records of the mine's production were seen that show a total of \$63,842 in gold and silver. In the crude ore shipped the silver value was comparatively insignificant, the ratio of gold to silver by weight being as 6 to 1.

MOUNT PITT MINE (gold) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Mount Pitt mine, now known as the County Line mine, is owned by G. E. Howland, of Grants Pass. It is located almost on the line between Jackson and Josephine counties in Sec. 31 T. 34 S., R. 4 W. (and in Section 36 adjoining) 10 miles east of Hugo, at an elevation of about 3050 feet, as measured by barometer. It is equipped with a 5-stamp mill with 2 boilers, a 40 H. P. engine, a crusher, a Frue vanner, an 11-foot Pinder concentrator, a 10-foot amalgamating plate, an air compressor, and a cyanide plant. It is opened by about 800 feet of underground work of which more than 500 feet is in the main adit which enters as a crosscut S. 75° E. for 190 feet, and continues as a drift S. about 10° E. some 300 feet. It terminates in a fault or slip containing no ore. The ore consists of pyrite in quartz and calcite forming a vein in plicated argillite associated with serpentine.

MT. BAKER MINING COMPANY

WASHINGTON

Office: 4th and Oak Sts., Portland, Oregon. Henry Hahn, Pres.; Leo Friede, Sec., both of 4th and Oak Sts., Portland. Capital stock, \$1,000,000; par value, \$1.00; \$977,300 subscribed, issued and paid up. (1916 report.)

This company's properties are located in Whatcom county, Washington.

MT. REUBEN MINING COMPANY GALICE DISTRICT JOSEPHINE COUNTY

Office: 214 Abington Bldg., Portland, Oregon. H. P. Heninger, Pres.; Ed. W. Mueller, Sec.; H. P. Heninger, Treas., all of Portland. Capital stock, \$100,000; par value, \$10.00; \$50,300 subscribed, issued and paid up. (1916 report.)

This company was organized in January, 1916. It has the "Anna," "California," "Virginia," "C. D.," "Albany," fraction of the "Oversight," "Arthur C.," and "Utica" claims located on a spur of Mt. Reuben in Josephine county. Some tunneling, sinking shaft and stoping has been done.

MT. SHASTA MINING COMPANY

CALIFORNIA

Office: 400 Henry Bldg., Portland, Oregon. H. S. Attix, Pres., Berkeley, Calif.; Theo. Burkhart, 955 Wilton Ave., Portland, Sec.; A. A. Lindsley, 400 Henry Bldg., Portland, Treas. Capital stock, \$50,000; par value, \$100, all subscribed, issued and paid up. (1916 report.)

This company's properties are located near Shasta, California.

MT. ST. HELENS CONSOLIDATED MINING COMPANY

WASHINGTON

Office: 1208 Northwestern Bank Bldg., Portland, Oregon. Thomas Prince, Pres.; Frank M. Bell, 1208 Northwestern Bank Bldg., Portland, Sec. Capital

stock, \$1,800,000; par value, \$1.00; \$1,698,444 subscribed, issued and paid up. (1916 report.)

This company's properties are located in Skamania county, Washington.

MULE MOUNTAIN MINES (gold) MULE CREEK DISTRICT CURRY COUNTY

Property consists of 1 placer and 11 lode claims. Owned by G. W. Billings and situated on both sides of Rogue river about 3 miles below the mouth of Mule creek. There are 3 principal veins, Mule mountain, Big Devils Stairs creek, and Keystone veins. The country rock of all the veins is greenstone.

The Mule mountain vein is developed by a 25-foot open cut 12 feet wide an 86-foot shaft and several smaller cuts. The strike of vein is N. 60° E. and dip 60° SE. The vein is made up of about 1 foot of nearly solid quartz and about 2 feet of vein material heavily impregnated with iron. The 3 feet of quartz and iron bearing material is mined and milled in the 2-stamp mill and cyanide plant on the property. This 3 feet of ore is reported to average by sampling about \$7.25.

The Big Devils Stairs creek vein is 500 to 600 feet northwest of Mule mountain vein. This Big Devils Stairs creek vein is from 1 to 4 feet wide in the lower workings which splits up in the upper workings to several veins over a width of 4 feet and still higher up they fan out to 15 feet wide with several 1-foot veins and many smaller ones in between. These are quartz iron-stained veins with some pyrite and chalcopyrite. Separate mill runs recovered \$26.80 and \$18.00. Vein samples over 7 feet 4 inches assayed \$13.37; another one over 9 feet 2 inches assayed \$13.67, according to reports.

The Keystone vein is a shear zone mineralized from a few feet wide to a maximum width of 20 feet or more. It is similar to Big Devils Stairs creek vein as shown in open cuts and tunnels. Assay values reported to be from \$2.50 up to about \$100.00.

MUNDY MINE (coal) ASHLAND DISTRICT JACKSON COUNTY

In Sec. 17, T. 38 S., R. 1 E., at an elevation of about 2400 feet, some thin seams of coal have been opened by J. F. Mundy, of Medford. The development work included several drill holes and the results indicate the presence of at least 2 coal seams about 500 feet apart.

In Sec. 16, T. 38 S., R. 1 E., a coal seam has been opened by Emmett Beeson of Talent by means of a slope or incline shaft following the coal nearly on its dip. This coal outcrops in a ravine at the foot of a sandstone cliff at an elevation of about 2600 feet. Fossil impressions of leaves were collected from shaly sandstone at an elevation of about 3050 feet near the top of the cliff a little south of east of the coal seam. The sandstone strikes about S. 45° E. and dips about 25° N. E. at the place where the fossils are found. The coal seam has a strike of N. 53° W. and a dip of about 16° N. E. The slope opening this coal discloses a fault at 70 feet from the portal which strikes N. 10° W. and dips about 62° E. The hanging wall of the fault is displaced vertically downward about 6 feet. At about 120 feet from the portal the coal seam is narrowed to about 3 inches by the doming up of the floor; at the breast, about 130 feet from the portal, the coal is again nearly 2 feet thick.

MUNITALP MINES CORPORATION

Formed in 1914—no report filed. Dissolved by proclamation in January, 1917.

MYER CLAIM UPPER APPLEGATE DISTRICT JACKSON COUNTY

See "Wright & Myer" claims.

NANCY DONALDSON MINING COMPANY (Wyoming corporation) NEVADA

Office: 220 West 19th St., Cheyenne, Wyoming. C. C. Tracy, 170 11th St., Portland, Oregon, Pres.; Walter E. Pratt, Goldfield, Nevada, Sec.-Treas.;

A. J. Anderson, 264½ 4th St., Portland, Attorney-in-Fact. Capital stock, \$1,500,000; par value \$1.00; \$1,035,550 subscribed and issued; \$1,500,000 paid up. (1916 report.)

This company has 72.94 acres of patented mineral lands in Goldfield mining district, Nevada. It is located about 8 miles by good wagon road to the northeast of Goldfield. The geology consists of rhyolitic tuff intersected by basalt, andesite and rhyolite dikes. The mineral deposition occurs in or alongside of these dikes, and is increased at the crossings or intersections.

NATIONAL COPPER MINES COMPANY SEVEN DEVILS DIST. IDAHO
WALDO DISTRICT JOSEPHINE COUNTY, OREGON

Local name: "Coad Placer and Gold Bar."

Office: 926 Chamber of Commerce Bldg., Portland, Oregon. L. C. Mackay, Pres., 926 Chamber of Commerce Bldg., Portland; E. H. Hayes, Sec., Portland, Oregon; F. H. Coffey, Portland, Treas. Capital stock, \$3,000,000; par value, \$1.00; \$1,630,318 capital stock issued and paid up. (1916 report.)

This company has 31 copper claims near Cuprum, Seven Devils mining district, Adams county, Idaho, and 2 claims in Josephine county, Oregon, called the Gold Bar mine and Coad placer mine.

The Coad placer now called the National placer is on Sucker creek at the mouth of Grizzly gulch near N. W. corner Sec. 4, T. 41 S., R. 6 W., and the Gold Bar mine is about in Sec. 7 of same Township near top of Bollon peak. These properties are about 37 miles from the railroad at Waters creek station and 12 miles from the wagon road at Holland.

On the placer claim only assessment work is done. At the Gold Bar mine there is a 50-foot shaft and two adits upon a quartz vein which is from 2 to 4 feet wide and of good milling grade. This information was secured from Wm. Trevor.

NAY AUG IDAHO MINES COMPANY IDAHO

Office: 214 Lumber Exchange Bldg., Portland, Oregon. George W. Holcomb, Pres.; Jos. J. Fisher, Sec.-Treas., both of Portland, Oregon. Capital stock, \$250,000; par value, \$1.00; all subscribed, issued and paid up. (1916 report.)

This company's properties are located in Blaine county, Idaho.

NEIL MINE (gold) ILLINOIS RIVER DISTRICT JOSEPHINE COUNTY

Diller says:

On the south fork of Fiddlers gulch, at an elevation of nearly 2400 feet, 6 miles west of Kerby, is the mine owned by Neil brothers and recently sold to the Segno-Tomek Gold Mining and Milling Company for \$80,000, according to report.

The discovery of the Neil mine was made by a short tunnel that yield, it is said, some remarkably rich dark telluride ore. The discovery tunnel is near the contact of the greenstone and serpentine. It has caved in, water issues from it, and the rich ore reported is inaccessible at the present time.

The Segno-Tomek Company has run a large tunnel N. 68° W. for about 300 feet to a contact and then followed the contact south for nearly 100 feet in an attempt to strike the rich ore several hundred feet beneath the original discovery.

The rocks along the contact are much crushed and for 6 to 12 inches have much sheared material which is decidedly serpentinous. As far as seen it contains little evidence of ore.

NELLIE WRIGHT (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Nellie Wright mine is on the south slope of Blackwell hill about 2 miles east of Gold Hill in the S. W. ¼ Sec. 24, T. 36 S., R. 3 W. A Beers mill to be operated by electric power is under construction; it is provided with plates and a Johnson concentrator. The vein is opened by 2 shafts 50 and 60 feet deep connected by a drift 130 feet long which extends 30 feet beyond one shaft. The ore is chiefly quartz with some pyrite, chalcopyrite, and a dark sulphide resembling galena. The veins strikes about N. 75° W. and

dips about 87° N.; it varies in thickness from 1 to 4 feet. The country rock is the Siskiyou tonalite which is here cut by a dyke of andesite, while the vein cuts both the tonalite and the dike.

The property has been operated by Messrs. Haaf and Ray of Gold Hill during the past year and has been sold recently to R. M. Wilson who will proceed with further development.

NELSON PLACERS**BAKER DISTRICT****BAKER COUNTY**

The Nelson placers situated at the mouth of Salmon creek in Sec. 8, T. 9 S., R. 39 E., has a reported total production in excess of \$400,000. These placers have not been worked for years.

NESBIT GROUP (gold)**GALICE DISTRICT****JOSEPHINE COUNTY**

The Nesbit group is about 2 miles west of Galice and at least 2 miles southwest of the Oriole mine at an elevation of about 175 feet above sea level. The group is prospected by three adits, the lowest being a crosscut S. 50° W. about 75 feet showing no vein. The middle adit is a drift extending N. 65° W. about 30 feet in a lode in a talc schist at an elevation of about 1900 feet. The upper adit runs N. 42° W. and at the face discloses the contact between talc scist and a dark bluish rock resembling dunite. The contact is marked by a fault which dips 60° N. W. Diller states that the mountain slopes at the Nesbit are covered by a deep capping of yellowish iron-stained residual material which in places yields free gold. Considerable gold has been won from this residual material by panning. The average of a number of assays is said to be \$6.50 a ton, and it seems probable that it would pay well to hydraulic the whole slope.

NEW ELDORADO MINING AND REDUCTION COMPANY (gold)**NEW ELDORADO DISTRICT****GRANT COUNTY**

Local name: "Pioneer Mine."

Office: Austin, Oregon. E. B. Reed, Pres.; Edwin H. Saxe, Sec.-Treas. 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.

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 ferromagnesian 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 consists 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 pyrrargyrite, 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 cross-cuts in the zone.

The company also owns a group of claims similar in every way to those described under the title (J. L.) Krause.

NICKEL MINES AND SMELTING COMPANY**JEFFERSON COUNTY**

Office: Portland, Oregon. Will H. Bard, 416 Pittock Block, Portland, Pres.; W. J. Maxwell, Portland, Sec.; Clarke C. Foster, Buchanan Bldg., Portland, Treas. Capital stock, \$300,000; par value, \$1.00; \$157,000 subscribed, issued and paid up. (1916 report.)

No information could be obtained concerning the properties of this company except that it has 3 claims in Jefferson county, Oregon.

NIGHT HAWK PROSPECT (gold)**AGNESS DISTRICT****CURRY COUNTY**

This prospect, which is owned by Frank Fry and C. W. Sinniger, occurs at an elevation of about 1750 feet as determined by the barometer, about 4 miles southeast of Agness on the ridge between the Illinois river and Indigo creek.

The deposit is a sheared and brecciated zone in a very basic greenstone which is partially altered to serpentine at some points. The ore consists principally of pyrite which occurs in kidneys or nodules irregularly distributed throughout the zone. These rounded masses are very hard and solid, and some of them are a foot or more in diameter. Attention was first attracted to the deposit by a bluish-green efflorescence which appears on the surface of the rock in wet weather. No free gold has been found in this prospect, and an assay of one of the nodules of solid pyrite yielded not a trace of that metal.

NOBLE METALS EXTRACTION COMPANY (placer)**COOS COUNTY**

Local name: "Lane Black Sand Mines."

Office: Bandon, Oregon. C. C. McIver, San Francisco, Pres.; W. W. Mendenhall, Bandon, Oregon, Sec.-Treas. Capital stock, \$50,000; par value, \$1.00; all subscribed, issued and paid up. (1914 report.)

This company has a 10 years lease on what is known as the "Lane Black Sand Mines" consisting of about 100 acres at the head of "The Lagoons" 6 miles north of Bandon. It is an elevated beach mine 160 feet above sea level in Sec. 33, T. 27 S., R. 14 W.

NONE SUCH MINE (gold)**UPPER APPLGATE DISTRICT****JACKSON COUNTY**

The None Such mine, 2 miles east of Applegate is half a mile east of Humbug creek and about as far north of Applegate river. It is owned by Longwell and Company, who report that it is opened by a shaft and about 200 feet of workings on a quartz vein. The ore is hauled to the Applegate river and treated in a 3-stamp mill run by water power, which was in operation in September, 1913.

NORLING MINE (gold)**JACKSONVILLE DISTRICT****JACKSON COUNTY**

The Norling mine is about 4 miles west of Jacksonville and 1/2 mile southwest of the Yellow King and is owned by Medford Mining and Milling Co.

During June and July, 1913, Mr. Butterly was driving a crosscut adit for the company, his compensation being the right to stope a given area. During development in 1905-1907 the Norling is reported to have produced 120 tons of ore worth \$6400. The main adit is at an elevation of 3130 feet as measured by aneroid barometer. For 240 feet it follows a vein which dips 75° S. with minor irregularities. The gold is said to be chiefly in the quartz; the pyrite is even more abundant in the rock adjoining the vein than in the vein itself. Considerable ore has been stoped out above this adit. The vein is 8 to 18 inches wide containing much quartz. The country rock is like that at the Yellow King. A new crosscut adit has been driven S. 13° E. about 215 feet at an elevation of about 3115 feet; it is expected that this entry will strike the vein when driven about 100 feet farther. It intersects one vein at 125 feet from the portal, which strikes N. 65° W. and dips about 65° N. A stringer at 150 feet from the portal strikes N. 83° W. and dips about 65° N.,

and another at 200 feet from the portal strikes N. 87° W. and dips 70° north. It is reported that further development work was done in 1916, drifting on the main vein.

The mine is equipped with a 5-stamp mill, having plates and vanner, run by engine; it has not been in operation since 1911.

NORTH FAIRVIEW MINING COMPANY (gold) BOHEMIA DIST. LANE COUNTY

Office: 38 E. 6th St., Eugene, Oregon. George W. McQueen, Pres., Cottage Grove, Ore.; Herbert Leigh, Sec., Eugene, Ore.; Darwin Bristow, Treas., Eugene, Ore. Capital stock, \$300,000; par value, 10 cents; all subscribed, issued and paid up. (1915 report.)

Property consists of 15 claims located just north of Fairview mountain, in Sec. 11, T. 23 S., R. 1 E., about half a mile from Bohemia post office, which is about 15 miles southeast of Disston, the terminus of a 20-mile branch railroad from Cottage Grove.

The country rock is andesite. The mineralized fractured zone is said to be 12 feet wide, strikes N. W.-S. E. and dips to the south. It is said to have been traced for more than a mile and opened up with pits, etc.

Development work consists of 2 tunnels, one 300 feet long 100 feet below the outcrop; another 150 feet in length having a depth of 450 feet.

NORTH FAIRVIEW MINE BOHEMIA DISTRICT LANE COUNTY

Consists of 15 claims owned by Alfred S. Walker and George Midgely. See North Fairview Mining Company.

NORTH FORK MINE (placer) GRANITE DISTRICT GRANT COUNTY

These placers are in Secs. 32 and 33, T. 7 S., R. 35½ E. The interesting 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 David West a smaller 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 a small per cent 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 per cent 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 per cent

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 one-fourth of a mile below the mouth of Trail creek, and gold has been recognized in commercial quantities for about three-fourths of a 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 Belview 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 newer 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.

NORTH GEM MINE (gold)

SUSANVILLE DISTRICT

GRANT COUNTY

This mine is located about 1 mile north of Susanville in Sec. 5, T. 10 S., R. 33 E., about 500 feet above the town. The vein strikes north and south and dips east about 60°. An incline shaft is down about 350 feet from which 4 levels have been driven. The shoot is from 2 to at least 6 feet wide and about 300 feet long. The ore averages about \$10 with concentrates \$40 to \$50. Seventy-five to 100 tons have been milled elsewhere and a few tons shipped crude. Only \$3 to \$4 is in free gold. The ore is a massive coarse intergrowth of copper, iron and zinc sulphides in quartz gangue. Country rock is argillite. The property was closed down in 1909, but in September, 1916, a carload of crude ore was sorted and shipped to smelters.

NORTH POLE MINE (gold) CRACKER CREEK DISTRICT BAKER COUNTY

Office: Baker, Oregon. Emil Melzer, Attorney-in-Fact for Baring Brothers of London, England.

John C. Lewis, of Portland, Oregon, has had a lease and bond upon the property for about 3 years and has prosecuted development on the 5th level and has run a raise from No. 1 level of the E and E mine to No. 1 level of the North Pole mine. An arrangement with the E and E mine permitted the use of their No. 1 level north for this purpose. Ore below No. 1 can now be hoisted to that level where it can be taken by aerial tram to the mill. The mill has been run for short periods only during the last two years. Very little development has been done this year (1916). For a description of the property, attention is called to the section which treats of the "Columbia Gold Mining Company" where the mines upon the North-Pole-Columbia lode are described.

NORTH SANTIAM MINING COMPANY (gold) NORTH SANTIAM DISTRICT MARION COUNTY

This company was incorporated in 1908 with a capital stock of \$1,000,000, par value of shares \$1.00, but it is not listed in the office of the Corporation Department as being in good standing.

According to a prospectus of the company the property consists of 8 claims along the Little North Fork of the Santiam river about 16 miles northeast of Gates. The company reports a vein 6 feet wide which is developed by a 50-foot open cut. No activity at present.

NORTHWESTERN GOLD AND COPPER COMPANY (gold and copper) SUSANVILLE DISTRICT GRANT COUNTY

Local name: "Chattanooga Mine."

Office: Susanville, Oregon. C. H. Duncan, Sec., Wheeling, W. Va. Capital stock, \$1,000,000; par value, \$1.00; \$680,379 subscribed, issued and paid up. (1916 report.)

This company owns 2 claims. The Chattanooga mine is located in Sec. 5, T. 10 S., R. 33 E., in greenstone and serpentine and not far from the Compton, North and South Gem, and the vein and vein minerals are practically the same. There is a perpendicular shaft down 200 feet and the ledge is reported to be from 1 to 8 feet wide in a shoot at least 75 feet long which is reported to average about \$9 a ton.

The great handicap of the companies in this group is that the ore is a massive complex sulphide and that it is located about 25 miles over a poor wagon road from Austin, the nearest shipping point.

OAK MINE (gold and copper) GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Oak mine, 6 miles east of Hugo is in the S. W. $\frac{1}{4}$ of Sec. 4, T. 35 S., R. 5 W., on Jump-off Joe creek, northwest of Walker mountain. This mine is owned by G. A. Baker and George Buell, of Grants Pass, and is equipped with a 20 H. P. gasoline engine and an 8 by 8 air compressor. The main adit enters as a crosscut in greenstone (probably an altered andesite); N. 60° E. about 200 feet from the portal a winze follows the vein down about 50 feet. At the winze solid chalcopyrite ore is visible in the footwall on the main gold-bearing vein which here strikes N. 13° W. and is nearly vertical. At three other points along the drift following the gold-bearing vein small veins of copper ore are visible in the walls. The workings have a total length of about 800 feet. The minerals present in ore of the Oak mine include chalcopyrite, pyrite, pyrrhotite, sphalerite, galena, quartz, and rare malachite and pyrolusite.

One or two veins contain good copper ore.

OGLE MOUNTAIN MINING COMPANY (gold)**OGLE CREEK DISTRICT****CLACKAMAS COUNTY**

Local name: "Ogle Mountain Mine."

Office: 1003 Main St., Oregon City, Oregon. J. B. Fairclough, Pres.; W. J. Wilson, Sec.-Treas., both of Oregon City. Capital stock, \$1,000,000; par value, \$1.00; all subscribed, issued and paid up. (1916 report.)

This company's property consists of 22 claims which are located on the north side of Henline mountain at the headwaters of the South Fork of Molalla river in Sec. 9, T. 8 S., R. 4 E., reached by a poor wagon road 35 miles east from Silverton. The property can also be reached from Gates on the S. P. railroad by good wagon road for 10 miles northeast to the Silver King mine, then 4 miles by trail over the divide to the north.

The country rock on this property is very largely andesite and closely related igneous rocks. The ore body as shown by a stope in the upper workings near the surface is a well defined fissure vein with smooth, clear walls and averaging about 5 feet in width. The earlier operations on the property were confined to the upper workings where 2 tunnels have been driven to connect with the vein and the vein stoped to a depth of approximately 200 feet from the grass roots. Some very good ore is reported to have come from this stope, being largely oxidized material having numerous particles of free gold and wire gold scattered through it. It is claimed by the company that the entire tonnage stoped netted about \$5 a ton in free gold.

The development in latter years consists of a long crosscut tunnel 560 feet below the upper workings and 1460 feet long intending to cut the vein exposed above at this depth. Numerous small veins were cut with this long crosscut and an aggregate of several hundred feet of drifting on these different veins has been accomplished. The ores exposed in these veins, according to the report of the management, are usually quite low grade and the principal problem has been to determine which of these veins in the lower crosscut is the same as the more productive vein developed in the upper workings.

The company has been unfortunate in spending several thousand dollars on revising the equipment of the old mill which was ill-arranged and failed in many respects to be a success. The mill was planned and installed by an incompetent engineer who was apparently well recommended to the company. Under his advice the stamps in the old mill were thrown out and the ore fed directly from the crusher to the tube mill, the individual pieces of the ore being about the same size as the grinding pebbles. An attempt was further made to experiment with some untried schemes of agitation in the cyanide plant rather than accept standard successful agitation processes. In numerous other regards the installation was ill-advised, with the result that the experiment was entirely unsuccessful. The failure of the mill to do what was expected of it has been quite discouraging to the stockholders with the result that little activity is now in evidence at the property.

OLD CHANNEL HYDRAULIC MINING CO. GALICE DISTRICT JOSEPHINE COUNTY

The old Channel Hydraulic Mining Company (dissolved January 5, 1914,) controls a large area of "high level" placer deposits near Galice; they form a gravel terrace parallel to Galice creek and Rogue river and more than 2 miles long. The terrace is about 600 feet above the creek and has a thickness of over 100 feet. The bedrock consists chiefly of argillites of the Galice formation. The main ditch from Galice creek is said to supply 5000 miner's inches of water during the rainy season; the giants work under a head of about 350 feet. According to Diller, who gives a detailed description of this deposit with several drawings:

The coarse gravel at the bottom is well rounded and composed largely of greenstone with considerable quartz. Cobblestones as large as 8 inches in diameter are common.

North of Rich gulch boulders are numerous, but on the south side boulders are few, and the gravel is quite firmly cemented. This coarse bottom layer of gravel and boulders is limited to the main channel and contains most of the gold, although some gold is said to be distributed throughout the great thickness of overlying fine gravel and sand. A large body of available gravel lies south of Rich gulch where most of the recent work has been carried on. The bedrock is chiefly slate with some sandstone, but near the western border of the mine north of Rich gulch the slates are cut by dikes and both rocks are affected by a small fault that strikes N. 80° W. and dips 72° S. W.

Other faults are believed to exist in the bedrock of these deposits.

OLD GLORY GOLD MINING COMPANY (copper-gold-silver)
GALICE DISTRICT

JOSEPHINE COUNTY

Local name, Old Glory mine.

Office: Grants Pass, Ore. C. L. Mangum (deceased) Pres.; William Stock, Sec.-Treas., both of Grants Pass. Capital stock \$1,000,000; par value, \$1.00; all subscribed, \$604,200 issued and paid up. (1916 report.)

This company owns the Old Glory mine on Silver creek, 25 miles due west from Grants Pass, which consists of 4 lode and 2 placer claims, said to show a large lode of low-grade copper ore carrying gold and silver values.

In 1914 the development work consisted of 2 tunnels 40 feet in length exposing a quartz vein which is said to average \$10 a ton in gold. The ledges run in a general east and west direction. In 1915 \$1200 worth of development was done.

OLIVE CREEK MINING COMPANY (placer) GREENHORN DIST. GRANT COUNTY

Office: Baker, Oregon. Thomas M. Tobin, 9332 South Chicago Ave., Chicago, Ill., Pres., S. A. Tobin, Baker, Sec., Adam J. Weckler, 3446 Broadway, Chicago, Ill., Treas. Capital stock, \$1,000,000; par value, \$1.00; all subscribed, issued and paid up. (1916 report.)

This company owns the Olive creek and Quartz gulch placers joining the Golden Gate lands, in sections 2, 3, 10 and 11, T. 10 S., R. 35 E.

OPHIR MAYFLOWER MINE (gold) OCHOCO DISTRICT CROOK COUNTY

Owned by A. J. Champion of Howard, W. T. Davenport and E. A. Davenport of Prineville, and Julius McAllister.

Property is located in the Ochoco National Forest in Sec. 30, T. 13 S., R. 20 E. The nearest postoffice is Howard, about 8 miles distant. There is an excellent road through Howard to Prineville, a distance of 26 miles from the mine. The nearest railroad station is Redmond, a distance of 15 miles beyond Prineville. The country is somewhat rugged and is well timbered. The region is made up of a series of andesitic flows interbedded with which are andesitic tuffs and breccias. Mineralization has taken place in rather wide fractured zones in which the country rock is much altered.

On the surface above the workings (after the soil has been stripped), the intensity and width of the mineralization is quite noticeable. At a distance of several hundred feet on the other side of the hill, from the mill and principal development, some placer work is being carried on. Placer deposits seem to be almost of the residual type, in that the gold has not been carried to any great distance. In fact, in many cases short prospect tunnels have been driven in the mineralized bedrock after the soil had been washed off.

The development work consists of a 1400 foot crosscut on the mill level and one a few hundred feet in length about 200 feet above. There are short 100-200 foot drifts running in each direction from the lower crosscut along the fractured zones. Also raises and some ore has been stoped. The ore from one stope having a width from 1 to 6 feet, a vertical length of 250 feet and a horizontal length of 70 feet, was shipped and is said to have averaged \$70 per ton. Another shoot called the Ophir shoot 20 feet long, with a maximum thickness of 4 feet is said to average \$125 per ton. It has been stoped for 40 feet

vertically. A large part of the ground cut by the main adit is said to average about \$3 per ton.

There is a small stamp mill with amalgamating plates and concentrators on the property.

OPHIE MINE (gold)

SUSANVILLE DISTRICT

GRANT COUNTY

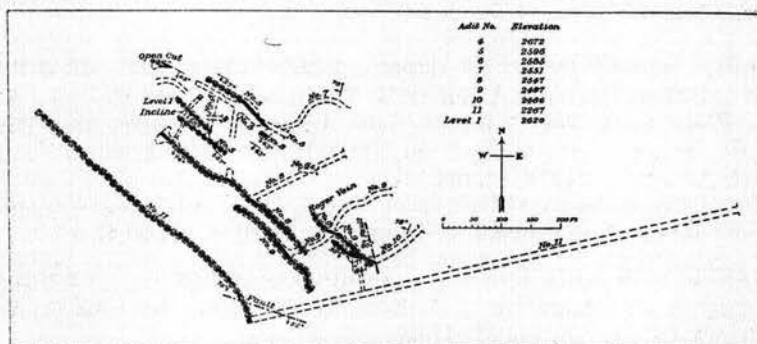
This mining prospect, which is on the same side of Elk creek as the Badger mine and not far from it, is inactive.

OPP MINE (gold)

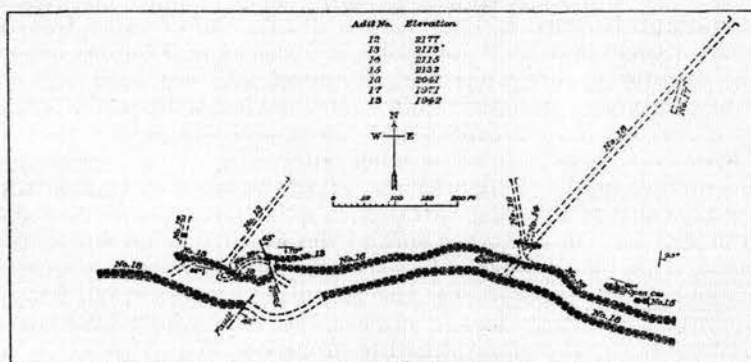
JACKSONVILLE DISTRICT

JACKSON COUNTY

The Opp mine was discovered many years ago, but its chief development has taken place within the past 10 years. According to Mr. Beekman, the banker at Jacksonville, the mine produced about \$100,000 while controlled by him. Since then it has been operated by a company, by Mr. J. W. Opp, and by lessees. The mine is located in sec. 36, T. 37 S., R. 3 W. about 1½ miles west of Jacksonville at elevations ranging from about 1850 to 2850 feet above sea level. The land held by the mining company includes nine 40-acre plots and 1 mining claim, making a total of 373 acres. It is opened by 18 adits disclosing three main veins. The longest crosscut entry is about 850 feet; another is 550 feet long. The total underground workings amount to about 7000 feet, the distribution of which is shown in the figures. The surface equipment con-



Opp mine, east workings



Opp mine, west workings

sists of about 3600 feet of tram line, a 6-drill Leyner compressor, a 20-stamp mill with concentrator, a 125-ton cyanide plant, and other buildings. The mill has a crusher, a Dorr classifier, 1 Wilfley and 6 Johnson concentrators, 20 stamps and 4 plates.

The adit 10 or Roger vein is apparently the same as the adit 7 vein, although it is not easily seen in adit 8 which it should cross at a point about 60 feet from

the portal. At the breast of adit 7 a slip or fault strikes north and dips 50° E.; its effect on the vein is not clear because of lack of development work. The Roger vein strikes N. 60° W. and dips $50-63^{\circ}$ S. W. It has a thickness of 3 to 12 feet of which 2 to 4 feet usually contain most of the gold. The hanging wall is well defined, but the vein grades into the footwall, which is replaced or impregnated with ore. The footwall in adit 10 is a dark shaly rock which strikes N. 5° W. and dips about 84° E. Near the portal of adit 7 the footwall shale strikes N. 15° E. and dips about 70° W. This shaly rock is interbedded with quartzite samples of which from the hanging wall of adit 10 consist of fine granular quartz in places, in bands of varying size with more or less yellowish brown iron stain and rare crystals of pyrite; less commonly the stain is chloritic. In some places the ore is brecciated, and the original quartz is coarse and contains very little pyrite, which is found especially in the cementing material of calcite and quartz and also in fragments of carbonaceous shale. This is evidence that the ore was formed not at the time when the veins were first produced, but at a later time when they were fractured and new solutions brought in cementing materials. According to Mr. Opp the pay shoots are usually where the veins are thickest; in other mines when the ore is deposited simultaneously with the gangue this rule is usually reversed, and the condition at this mine is another indication that the gold was introduced after the deposition of the primary quartz of the veins.

The adit 8 vein is the southwest vein in adits 5 and 9 and is also seen in incline shaft 2 and probably in the old surface stopes. On adit 5 level this vein has a thickness of about 4 feet; it strikes about N. 50° W. and dips about 60° S. W. The country rock is a siliceous argillite containing some chlorite and pyrite.

The adit 1 vein is probably the same as the vein near the breast of adit 2; it may be continuous with the adit 8 vein, but there are no workings to prove the connection. In adit 1 the vein strikes N. 57° W. and dips about $75-80^{\circ}$ S. W. It has a thickness of 14 feet, 8 or 10 feet of which on the footwall have been stoped out to the surface. The country rock of the vein is an andesite rich in ferromagnesian minerals. A sample from near the portal contains abundant green hornblende, some brown hornblende, some plagioclase, some biotite, titanite, and a little quartz. This andesite is so intimately associated (as an intrusive sill?) with the old Paleozoic sediments that upon weathering it develops a schistosity nearly parallel with the bedding of the latter; near the portal of adit 1 this schistosity strikes N. 10° W. and dips 70° E.

The adit 2 vein (near the portal) has not been traced elsewhere; it strikes N. 65° W. where cut by the adit about 50 feet from the portal. It is possible, but not probable, that this is the same as the Roger vein.

The adit 11 vein is probably the downward continuation of the adit 8 vein, or possibly of the Roger vein. If the former interpretation is correct the Roger vein is probably represented by the small vein about 85 feet east of the main vein. The small vein strikes N. 53° W. and dips about 54° S. W.; it contains about one foot of quartz and 2 or 3 feet of sheared country rock. About 10 feet farther in a shear zone strikes N. 72° W. and dips 54° S. This is visible again where it crosses the drift not far from the crosscut; here it has the same strike and dip and a thickness of about 10 inches, but produces no apparent offset in the main vein. The latter is opened by a drift said to be 500 feet long disclosing a vein varying in thickness from 5 feet to a maximum said to be 25 feet. It strikes about N. 45° W. and dips about 75° S. W. Too much water prevented its inspection.

The adit 18 vein is shown by continuous stoping above that level to extend upward to adits 16, 15, 14, and 13. It varies in strike from N. 70° W. to S. 75° W., averaging nearly west, and dips about 68° S. The vein is continuous on the strike except where cut by a fault, shown clearly in the east drift from adit

13, which strikes N. 20° W. and dips about 65° E. On level 18 a fault block seems to separate the two parts of the vein and the west side of the block is marked by a fault which strikes about N. 38° E. and dips 42° S. E. The vein is largely quartz and averages about 5 feet thick. The value is said to increase where the thickness increases, being about \$5.00 a ton in the ore shoots. One ore shoot is about 300 feet long on this level; another is about 150 feet long. The longer one did not reach the surface by 40 or 50 feet in its middle half. After amalgamation ore from this vein concentrates about 40 into 1 and the heavy sulphides are worth about \$60 a ton. A rock sample from the crosscut entry (adit 18) contains abundant pale hornblende, some zoisite, calcite, and quartz, with a dark staining material; it is a much altered rock, probably originally a quartzose shale.

Mr. Opp has continued development in a small way during 1916, most of which has been on a new surface showing a few hundred feet south of the mill which he calls the porphyry vein.

The mine as a whole is in good shape and has a large amount of excellent equipment. A considerable additional expenditure is warranted in the further development of ore bodies already exposed in the mine and in arranging the mill to treat the same according to the best milling practice.

OREGON ASBESTOS MINES

CANYON DISTRICT

GRANT COUNTY

Office: 201 Stock Exchange Bldg., Portland, Ore. Joseph Woernle, Pres.; E. Sturchler, Sec.; Otto Berg, Treas., all of Portland. Capital stock, \$5,000; 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. 30 E. It is about 27 miles from the Sumpter 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.

OREGON BELLE MINE (gold) UPPER APPELGATE DISTRICT JACKSON COUNTY

The Oregon Belle mine, 8 miles by wagon road southwest of Jacksonville, is in the south half of sec. 6, T. 38 S., R. 3 W. near the head of Forest creek at an elevation of about 3000 feet. It is opened by several adits. The country rock is andesite and argillite. The vein is well defined and reaches a thickness of at least 8 feet in some of the stopes; it strikes S. 72° W. and dips 52° N. W.; it is cut off by a fault which strikes N. 64° W. and dips 74° N. E. The rock within and beyond the big fault 20 feet wide crossing the entry about 220 feet from the portal and dipping 75° S. W. is much altered by vein solutions. There are several adits above the main entry but they are caved and closed. One of them has a large dump at an elevation of 3250 feet. The mine was operated several years ago by a stock company. It is now owned by Minnie Ireland of Grants Pass.

OREGON BONANZA MINE (gold) LOWER APPELGATE DIST. JOSEPHINE COUNTY

The Oregon Bonanza mine, 12 miles south of Grants Pass and 3 miles southwest of Provolt, is in the S. W. ¼ sec. 16, T. 38 S., R. 5 W., south of Powell creek at an elevation of 2100 feet, as measured by barometer. The country rock is greenstone cut by aplite dikes. All the adits are caved and the mine buildings are in ruins. It is at present under option by Edward Layton of Applegate and J. M. Letherow of Grants Pass.

OREGON AND BRITISH COLUMBIA MINING AND DEVELOPING COMPANY**CANADA**

Office: 826 Northwestern Bank Bldg., Portland, Oregon. W. J. Peddick, Hood River, Oregon, Pres.; G. Evert Baker, 826 Northwestern Bank Bldg., Portland, Sec.-Treas. Capital stock \$150,000; par value ten cents; \$109,149.30 subscribed, issued and paid up. (1916 report).

Own Crown granted lands, Copper Mountain, Princeton, B. C., Canada.

OREGON CHIEF GOLD MINING COMPANY (gold) CABLE COVE DIST. BAKER CO.

Local name: "Oregon Chief Group."

Office: Baker, Oregon. J. T. Donnelly, Nortonia Hotel, Portland, Oregon, Pres.; Thomas Thornton, Sec.-Treas., Baker, Oregon. Capital stock, \$1,000,000; par value, \$1.00, all subscribed, issued and paid up. (1916 report.)

Eleven miles by wagon road northwest from Sumpter, a station on Sumpter-Valley R. R. (narrow gauge) in Sec. 22, T. 8 S., R. 36 E. Elevation 7000 feet in timbered area at head of Silver creek. Lands, 4 claims located in granodiorite area one mile south from Imperial mine on opposite side of Silver creek. Little work has been done upon the property recently.

OREGON FREEGOLD MINING COMPANY (gold) WEATHERBY DIST. BAKER CO.

Local name, Free Gold Group.

Office: Prairie City, Oregon. W. J. Hughes, Pres.-Treas.; Miss D. E. Hughes, Sec., both of Prairie City, Oregon. Capital stock, \$150,000; par value ten cents; \$133,478 subscribed, issued and paid up. (1916 report.)

Company owns 11 claims in Lost Basin 6 miles southwest of Durkee, Burnt river drainage, on the eastern slope of Pedro mountain at an elevation of about 4500. The region is made up of argillites and intrusive granodiorite. This is an old prospect but little has been done upon it the last few years. It is in litigation with homesteaders.

OREGON GOLD MINES COMPANY (gold and copper) (Arizona corporation)**GRANTS PASS DISTRICT****JOSEPHINE COUNTY**

Local name: "Granite Hill Mine."

Office: 1208 West Monroe St., Chicago, Ill. Elmer E. Dick, 736 W. Jackson Blvd., Chicago, Pres.; J. M. O'Grady, 854 Lakeside Place, Chicago, Sec.; Henry F. Comstock, 1262 Carmen Ave., Chicago, Treas.; H. D. Norton, Grants Pass, Oregon, Attorney in Fact. Capital stock, \$2,000,000; par value, \$1.00; \$2,000,000 subscribed and paid up, \$1,657,436 issued. (1916 report.)

The Granite Hill mine is in the S. W. $\frac{1}{4}$ Sec. 29, T. 35 S., R. 5 W. about 9 miles northeast of Grants Pass by wagon road. The mine was bought in 1901 by the American Goldfields Company, and developed extensively between 1902 and 1907 with a resultant production of about \$75,000. It was closed early in 1908, and is now owned by the Oregon Gold Mines Company.

The mine is equipped with a 20-stamp mill, having four 10-foot amalgamating plates, 6 Frue vanners installed and 2 more vanners available, a crusher, a 150 H. P. electric motor, and other accessories. The mine has also an air compressor, a steam hoist, and 5 machine drills.

The mine is opened by a vertical shaft said to be 430 feet deep, now filled with water. It is reported to be developed by about 5000 feet of workings on the 2nd level and about 7000 feet on the other levels. The vein is said to attain a width of 12 feet on the 3rd level and 14 feet on the 4th level; it has an average width of about 5 feet, and strikes about east and west and dips about 70° S. The vein filling consists of quartz, chalcopryrite, galena, and pyrite, carrying gold. The sulphides make up less than one percent of the ore and as concentrates they carry from \$75 to \$100 a ton, and are shipped to the smelter at Selby. The average value of all the ores treated in 1907 was about \$5 a ton.

The country rock is a tonalite grading toward granodiorite containing abundant plagioclase and quartz with some orthoclase, and pale green hornblende altering to chlorite. According to Kay this outcrop is part of a narrow tongue which extends southward into the Grants Pass quadrangle from a larger area of tonalite in the Riddles quadrangle. To the east of the tongue is greenstone, to the west is serpentine. At the Granite Hill mine the ores are found in a vein in tonalite; at the neighboring Red Jacket and Ida claims, owned by the same company, they occur in greenstone.

According to C. M. Morphy, former superintendent of the mine, the richest ores were found in 3 shoots each having a length along the vein of about 150 feet and a pitch to the west of south. The zone of oxidation extends to a depth of more than 200 feet from the surface, and the oxidized ores were more valuable than the sulphide ores.

The Red Jacket claim has quartzose ore carrying chalcopryite, galena and pyrite; alteration produces malachite and chrysocolla. The vein is said to be about 18 inches wide and of high grade in gold. It is reported to strike about northeast and dip about 45° N. W.

The main adit on the Ida claim is at an elevation of 2300 feet as measured by barometer; a quartz vein here strikes N. 65° W. and dips 70° S. W.; the vein is 3 to 30 inches thick and nearly pure quartz; it is cut off at 46 paces from the portal by a fault which strikes N. 25° W. and dips 45° S. W.

OREGON GOLD PROSPECTING AND PROMOTING COMPANY

Office: Chamber of Commerce Building, Portland, Oregon. W. M. Cake, Chamber of Commerce Bldg., Portland, Pres.; O. G. Hughson, 201 Wooster Bldg., Portland, Sec.; J. P. Newell, Spalding Bldg., Portland, Treas. Capital stock, \$18,000; par value, \$100; \$12,000 subscribed, issued and paid up. (1916 report.)

OREGON-IDAHO LEASES

Office: Care W. S. Moore, Yeon Bldg., Portland, Oregon. Wm. W. Elmer, 717 E. Broadway, Portland, Pres.; W. S. Moore, 507 Yeon Bldg., Portland, Sec.-Treas. Capital stock, \$20,000; par value, \$20.00; \$10,020 subscribed, issued and paid up.

This company owns no properties at present. The corporation is kept alive pending settlement of lawsuit in Idaho. (1916 report.)

OREGON-IDAHO INVESTMENT COMPANY

BAKER COUNTY

A corporation, capitalized for \$50,000; par value \$100; all subscribed, issued and paid up. James A. Howard, Pres.; Fred R. Mellis, Sec.-Treas.

The company's principal business at the present time is ore buying. A sampling plant is owned by them.

They formerly operated the Sovereign Consolidated Copper Company, Imperial Mining Company and recently the Humbolt Consolidated Gold Mines Company. All these properties are now inactive. They own the "Poorman mine" (prospect) and have recently taken a lease and bond on the Taber Fraction mine.

OREGON KING MINE (gold, etc.) ASHWOOD DISTRICT JEFFERSON COUNTY

Principal owners, J. B. Cartwright of Portland and J. G. Edwards of Portland. Located in Sec. 30 and 31, T. 9 S., R. 17 E., about 2 miles from Ashwood, which is 25 miles south from Shaniko, the railroad point.

The country rock is andesite and mineralization occurs in a brecciated steep-dipping zone. The width of the lode varies. At 170 feet below the collar of the shaft, it is about 20 feet. The ore bearing minerals are pyrite, galena, sphalerite, a little chalcopryite, and horn, ruby and native silver. There are lenses of massive sulphide material in the main vein.

The mine is developed by a shaft 640 feet deep with about 450 feet of drifts altogether. A crosscut 400 feet long connects with the shaft 170 feet below the collar. The property is patented and has been idle for several years.

OREGON MANGANESE COMPANY (manganese) GREENBACK DIST. JOSEPHINE CO.

Office: Portland, Oregon. J. H. Haak, 311 Lumbermens Bldg., Portland, Pres.; H. K. Haak, Portland, Vice-Pres.; I. Lowengart, Broadway and Burnside Sts., Portland, Sec.-Treas. Capital stock \$20,000.

This company has filed on a number of claims on Coyote creek, 6 miles east of Wolf creek station. Development work has been prosecuted on a showing of manganese ore but December first, 1916, was stopped on account of the winter weather. Further work will be undertaken at this property in the spring.

OREGON MINES CORPORATION BOHEMIA DISTRICT LANE COUNTY

Office: Eugene, Oregon. L. C. Hurd, Pres.; Herbert Leigh, Sec.-Treas., both of Eugene, Oregon. Capital stock, \$15,000; par value, \$100; all subscribed, issued and paid up. (1916 report.)

Property consisting of 11 mining claims is located near the corner of Secs. 7, 8, 17 and 18, T. 23 S., R. 2 E., about 3 miles from Bohemia post office, which is about 15 miles southeast of Disston, the terminus of a 20-mile branch railroad from Cottage Grove.

OREGON MINING AND POWER COMPANY (placer) DOUGLAS COUNTY

Office: Glendale, Oregon. C. R. Shipman, Glendale, Pres.-Treas.; A. M. LaFayette, 82 Beaver St., New York, Sec. Capital stock, \$500,000; par value, \$1.00; all subscribed, issued and paid up. (1915 report.)

This company's placer mine has been operated for a great many years up to the last 2 years. It is located 7 miles west of Glendale near Tunnel 7 on the Southern Pacific railroad.

The property consists of 320 acres operated with giants under 350-foot head with flume on 8 inch grade and an 80-foot dump into Cow creek. Gold runs 20 cents or better per yard, about 900 in fineness, which has always sold from \$18.25 to \$19.25 per ounce.

The property has been practically idle for the last 2 years owing to the unusually cold weather and lack of water.

OREGON-MONTANA MINING, MILLING AND MANUFACTURING COMPANY

Office: Wilcox Building, Portland, Ore. John D. Fletcher, Hood River, Ore., Pres.; H. S. Reed, Portland, Sec.; A. L. Reed, Portland, Treas. Capital stock \$20,000; par value \$10; all subscribed, issued and paid up. (1916 report).

OREGON NICKEL MINING COMPANY (nickel) RIDDLE DIST. DOUGLAS COUNTY

Incorporated under the laws of California; capital stock, \$500,000.

The property is reached by a good wagon road 5 miles west of Riddle station on the Southern Pacific Railway. There are 816 acres patented, un-

In certain parts of Nickel mountain the basic igneous rocks have been under the management of W. Q. Brown of Riddle.

The rocks in the neighborhood of Nickel mountain are mostly of a basic igneous variety called peridotite by Diller. The nickel ore is a silicate of nickel, genthite, and is found in veins or irregular bodies, probably produced by the action of rising hot waters from some deeper seated magma.

These nickel deposits have been prospected quite extensively and considerable effort has been made to satisfactorily solve the ore treatment problem in order to make the mine commercially successful. No satisfactory solution has yet been reached.

In certain parts of Nickel mountain the basic igneous rocks have been altered to serpentine and considerable bodies of chromic iron ore are found similar to its occurrence in other sections of southwest Oregon. Some of these chromite deposits have been developed somewhat, a few cars being shipped during the past summer by the Oregon Nickel Mining Company to the Illinois Steel Company, which Mr. Brown states average 55 per cent chromic oxide.

OREGON OIL COMPANY

Articles of incorporation filed July, 1916, by G. W. Evans, E. E. Gaucher, A. C. McKinnon and nine others. Office: McMinnville; capital stock \$25,000; par value, \$1.00.

OREGON PITTSBURG MINING COMPANY (gold) VIRTUE DIST. BAKER COUNTY

Local name: "Norwood Mine."

Office: Baker, Oregon. Alma Williams, Pres.; Melda E. Paulson, Sec.; Anna Williams, V. Pres.-Treas. Capital stock \$100,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

Lands consist of 4 quartz claims, Juniper, Wren, Albatross and Magnet. The property is situated in sec. 8, T. 9 S., R. 41 E., about 7 miles by wagon road from Baker and about 2 miles north of the Virtue mine. It is at an elevation of about 3900 feet, in sage brush covered hills on the west side of Virtue flat.

The Norwood mine, near the Virtue, is in similar greenstone, which is more altered. There are several veins, most of them too small to be considered seriously. Quartz and calcite are the vein minerals which in many of the veins has been shattered and slickensides are present as a result of these movements since the vein was formed. The largest vein is an E.-W. steep dipping vein, consisting of quartz, gouge and altered rock. The average width of this vein for 450 feet is about 2 feet. In 1913 a small mill was installed, but no idea of the value of the ore could be obtained and apparently no systematic sampling has been done recently.

Assessment work upon the 4 claims owned by this company was about all that was done in 1915 and 1916.

OREGON PLACER COMPANY

JOSEPHINE COUNTY

Articles of incorporation filed in 1915 by H. K. Owens, John C. Eden, Chas. L. Creelman, with office at Grants Pass. Capital stock \$15,000; par value \$1.00.

OREGON STRONG LEDGE MINING COMPANY (gold)

LOWER APPLGATE DISTRICT

JOSEPHINE COUNTY

Local name: "Michigan Mine."

W. G. Wisner, Pres.; D. C. Hoedemaker, Sec.; F. J. Knight, treas., all of Charlotte, Michigan. Capital stock \$1,000,000, par value \$1.00; \$636,893 subscribed, issued and paid up. (1916 report).

This company owns 80 acres deeded land, 3 lode claims of approximately 60 acres and a placer claim of 20 acres in sec. 16, T. 37 S., R. 5 W. The Michigan mine is about 6 miles south of Grants Pass and about 1½ miles west of Murphy, near the mouth of Board Shanty creek at an elevation of about 1300 feet as measured by barometer. It is equipped with a 64 H. P. engine, a hoist, and an air compressor operated by steam power, as well as a 5-stamp mill having a rock crusher, an 8-foot amalgamating plate, 2 jigs, 3 settling tanks and 1 slimer. The ore has been concentrated 10 into 1, and the concentrates sent to a smelter. The vertical shaft is said to be 130 feet deep with two levels; being full of water it could not be inspected when the mine was visited in August, 1913. The main vein strikes S. 73° E. and dips about 75° N. E.; it is 1 to 3 feet wide and contains pyritized quartz. It has been stoped out for about 100 feet along the surface to a depth of about 60 feet. An adit has

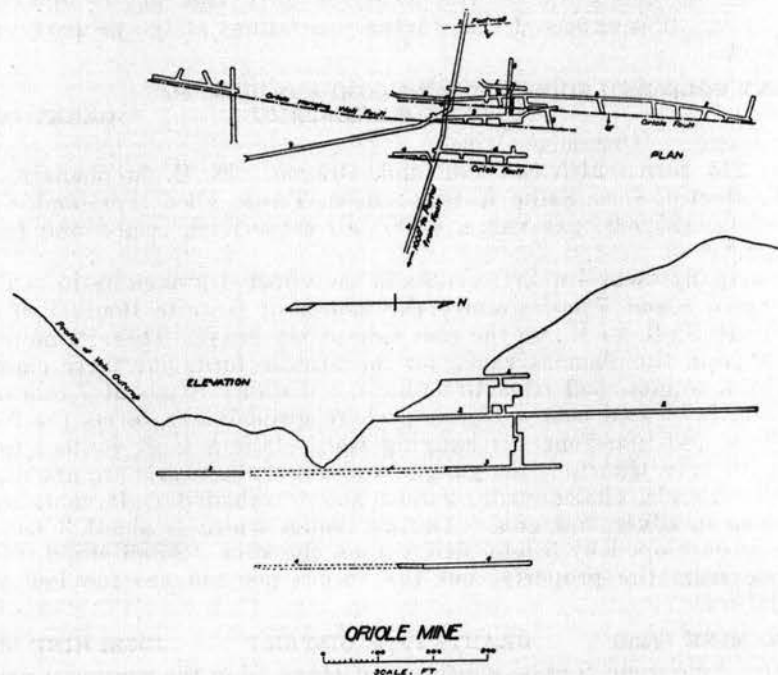
been driven N. 38° W. about 45 paces to tap another vein which has not yet been reached. There has been no activity at this property since 1913.

OREGON UTAH MINING COMPANY **CANYON DISTRICT** **GRANT COUNTY**
See "Great Northern Mine."

ORIOLE GOLD MINING COMPANY (gold) **GALICE DIST.** **JOSEPHINE COUNTY**
Local name: "Oriole Mine."

Office: Dayton, Ohio. Wirt Piper, Grants Pass, Oregon, Pres.; Miss Leah L. Russell, Dayton, Ohio, Sec.-Treas. Capital stock, \$1,000,000; par value 10 cents; \$650,000 subscribed; \$525,000 issued and \$520,000 paid up. (1916 report).

The Oriole mine is about 2 miles northwest of Galice on Rocky gulch at an elevation of about 1100 to 1400 feet above sea level and 300 to 600 feet above Galice. The Oriole Gold Mining Company, which was organized in 1909, owns 9 claims, 8 of which are arranged in 2 tiers with common end lines extending about 3000 feet north and south and 2400 feet east and west. The illustration shows a plan and section of the workings as prepared in 1911 by F. A. Jones, who had charge of the development. As shown in the section



Plan and elevation, main workings Oriole mine

the vein is opened on 4 levels to a maximum depth of about 500 feet below the outcrop and 325 feet between levels. The total length of underground workings on the four levels is more than 3200 feet.

The company has installed a power plant consisting of a Pelton wheel under a head of 350 feet; sufficient water is available, at least in the wet season, to run a 12x12 air compressor for two drills and a 7½ kilowatt D. C. generator at 115 volts. Stamp mill machinery was on the ground, but not yet installed in 1913. It included a jaw crusher, 10 stamps of 1000 pounds each, two plates, and 2 vanners.

The Oriole workings disclose a fault marked by 6 to 12 inches of soft

bluish-gray to dark green gouge and continuous with little variation in strike and dip for considerable distances. The average strike of the fault is N. 5° E.; the walls vary locally to N. 7° W. and N. 12° E.; the average dip is about 75° E. and the variations are usually between 65° and 80°. The fault is on the contact between greenstone and a rhyodacite porphyry, showing evidence of brecciation, apparently due to flowage while cooling. In thin section the rock shows phenocrysts of quartz and of more or less broken orthoclase and plagioclase, partly altered to zoisite and epidote, in a finely granular partly banded matrix of quartz, feldspar, sericite, and biotite.

It is more siliceous than an average quartz latite or rhyodacite and too high in soda and too low in potassa for a granite. But the alkali ratio combined with the microscopic study make it clear that the rock must be considered a silicified rhyodacite.

The greenstone near the vein is much sheared and chloritized. The ore is a milky to grayish quartz which occurs in lenses near the fault in the greenstone footwall, and carries a little pyrite and chalcopryrite. The ore is said to average \$15 to \$20 a ton.

The property has been in litigation for several years. It is reported that it was placed in the hands of a receiver in March, 1916, and that all indebtedness has been paid. It is expected that further operations at the property will be started soon.

ORNAMENT GOLD AND SILVER MINING COMPANY (gold, etc.)

GREENHORN DISTRICT

GRANT COUNTY

Local name: "Ornament Mine."

Office: 215 North 24th St., Portland, Oregon. H. H. Stephenson, Pres.; Bertha E. Martin, Sec.; Sadie A. Stephenson, Treas., all of Portland, Oregon. Capital stock, \$25,000; par value, \$1.00; all subscribed, issued and paid up. (1915 report.)

This company owns 4 quartz claims in the upper drainage basin of Granite Boulder creek about 7 miles above the mouth of Granite Boulder creek, in Sec. 11, T. 10 S., R. 34 E., on the east side of the creek. There is no road up this creek from the Thomas ranch on the Middle fork, but these claims are reached by a wagon road from Greenhorn, a distance of about 7 miles.

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, chalcopryrite, galena and tetrahedrite. It contains moderate values in silver and gold. 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.

ORO FINO MINE (gold)

GRANTS PASS DISTRICT

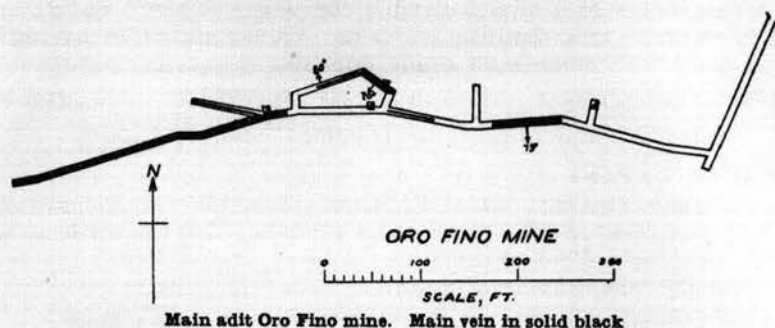
JOSEPHINE COUNTY

The Oro Fino mine, 9 miles southeast of Hugo, is in the southeast corner of sec. 3, T. 35 S., R. 5 W., south of Jump-off-Joe creek, at an elevation of about 2800 feet, as measured by barometer. It is owned by Saul Stone of Grants Pass and Seymour Bell of Portland.

It has recently been renamed the Gold Drift mine; it is equipped with a 5-stamp mill having a 10-foot amalgamating plate, a concentrating table, and suitable boiler and engine. It is only half a mile southwest of a ridge of "granite" which is probably part of the tongue of tonalite extending southward to the Granite Hill mine.

The main adit of the Oro Fino leads to about 1300 feet of crosscuts and drifts, nearly 1000 feet being on one or more veins which are persistent and fairly regular in their course. The country rock is a greenstone, which seems to be an altered andesite, containing abundant small crystals of hornblende,

some plagioclase phenocrysts, some epidote, little pyrite, quartz and chlorite. The workings on the main level are shown in the figure. The vein filling con-



Main adit Oro Fino mine. Main vein in solid black

sists of quartz which has been broken in many places with later introduction of calcite and pyrite. The iron sulphide is also found commonly scattered through the country rock, especially in fragments of the latter, which are in or near the veins. Work was in progress at the Oro Fino in 1913, but for the most part it was in shallow workings some distance from the main adit.

OSCAR CREEK CONSOLIDATED MINING COMPANY (placer)
LOWER APPELEGATE DISTRICT JOSEPHINE COUNTY

Local name: "Jewell & Moore Group."

Office: First National Bank Bldg., Grants Pass, Oregon. Charles Burkhalter, Pres.-Treas.; Alva H. Gunnell, Sec., both of Grants Pass, Oregon. Capital stock \$250,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company has the Jewell and Moore group of 5 placer claims, 3 being patented; the Swinded claim, unpatented; Carson group of 2 claims, unpatented; together with 92 additional acres of patented right of way and dump grounds located in Sees. 14, 15, 22 and 21, T. 37 S., R. 5 W., 2 miles east of Murphy and about 10 miles south of Grants Pass.

The equipment on this property consists of 2 giants, 1100 feet of pipe, 300 feet of flume and 3 miles of ditches. The water supply is sufficient for operations about 4 months in the year. It is said that the property has produced more than \$40,000 to date.

OSGOOD MINE (placer) WALDO DISTRICT JOSEPHINE COUNTY

For description see "High Gravel Mine."

PADDY CREEK MINE (gold) EAGLE CREEK DISTRICT BAKER COUNTY

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

PANTHER CREEK MINING COMPANY JOSEPHINE COUNTY

Office: Grants Pass, Oregon. Louis F. Kramer, Pres.; Henry W. Snyder, Sec.-Treas., both of Reading, Pa. Capital stock, \$250,000; par value, \$1.00; \$150,000 subscribed, issued and paid up. (1916 report.)

PARADISE MINE (gold) MULE CREEK DISTRICT CURRY COUNTY

Owned by G. W. Billings and others. It is near line between T. 32 and 33 S. in R. 10 W. on west side of the southern peak of Saddle mountain near the top and about 6 miles by trail from the mouth of Mule creek at Rogue river. Elevation 3200 feet.

Property developed by drifts about 300 feet long on a broken faulted vein in greenstone which strikes N. 85° west and dips 60 to 70° southwest and is from a few inches to 4 or 5 feet wide consisting of much quartz and vein material with some cross-faulting of vein. Values stated as averaging \$10 per ton in gold with some high grade bunches.

PARKERVILLE DIGGINGS GREENHORN DISTRICT BAKER COUNTY

See "Winterville and Parkerville Diggings" for description.

PARK MINING COMPANY

Office: Salem, Oregon. John E. Steen, Pres.; W. Y. Richardson, Sec.-Treas. Capital stock, \$25,000; par value \$1.00; \$16,791 subscribed; \$4806.85 issued and paid up. (1916 report.)

This company was organized in March, 1916. It owns no property as yet.

**PAYMASTER MINING AND MILLING COMPANY (lead, gold and silver)
QUARTZVILLE DISTRICT LINN COUNTY**

Local name, Paymaster mine.

Office: 399 East Forty-seventh St. N., Portland, Oregon. H. L. Cox, Pres.; Frank Converse, Sec., both of Portland. Capital stock, \$1,000,000; par value \$1.00; \$594,013 subscribed, issued and paid up. (1913 report).

Property located in Secs. 1 and 2, 11 and 12, T. 12 S., R. 4 E., 28 miles southeast of Gates. An old wagon road leads to within 3 miles of the property. It is reported by the management that a 130-foot drift has been driven upon a vein in which 14 inches will run from 75 to 90 per cent galena and the entire vein will average as much as \$25 per ton in lead, gold and silver. Dissolved by proclamation in January, 1917.

PAYNE'S MINE (placer) GREENBACK DISTRICT JOSEPHINE COUNTY

Payne's placer mine is near Foley gulch in S. W. ¼ Sec. 19, T. 33 S., R. 5 W., about 3 miles east of the Pacific highway on Coyote creek and about 5 miles from the station of Wolf creek. According to Diller:

The mine stretches up from the creek level to the terrace nearly 100 feet above. Coyote creek has but little fall, and the Ruble elevator has been used to advantage. The greenstone pebbles are completely rotten; those of slate are not so thoroughly decomposed.

An underlying dark gray gravel is fresh and unaltered.

PEACOCK MINE (copper, gold, silver) WALLOWA DISTRICT WALLOWA COUNTY

For location and description see "Contact Mining and Milling Company."

PEARCE MINE (placer) UPPER APPLEGATE DISTRICT JACKSON COUNTY

The Pearce mine, 4 miles southwest from Jacksonville, is on the east fork of Forest creek in Sec. 11, T. 38 S., R. 3 W. It is at present leased by Floyd Pearce, of Jacksonville.

The gravels have an average thickness of about 12 feet, but in places they have been 45 feet thick. In the lowest 6 feet of the deposit there are many large undecomposed boulders, but above this zone the material is gravel and sand not very strongly cemented. The best values are at and near the bottom. Some of the ground has run as high as \$7000 to the acre. The bed rock is greenstone, the slope of which is not more than 2 feet in 100 feet. The mine is equipped for hydraulicking, 3 giants being used. The pressure of the water is only about 85 feet. The property consists of 240 acres, a large part of which remains to be worked.

PEARL MINING COMPANY (gold) ELK CREEK DISTRICT JACKSON COUNTY

Local name, Buzzard mine.

Office: Central Point, Oregon. W. C. Leever, Pres.; J. W. Merritt, Central Point, Ore., Sec.-Treas. Capital stock, \$4400; par value \$20; stock entirely subscribed, issued and paid up. (1916 report).

Property is located on one of the branches of Elk creek, reached by good wagon road, 27 miles northeast from Trail. Property consists of 10 quartz claims held by location. Located in Secs. 20, 21 and 29, T. 31 S., R. 2 E. The property is at present leased and managed by Paul Wright, of Trail, Oregon.

Ore deposit is in a shear zone in andesite. Vein material is largely gouge with stringers of sulphides running through the gouge at different places. The values are closely associated with the sulphides, pyrite, sphalerite and galenite, the small stringers of sulphides often running as high as \$400 to the ton in gold. The plan adopted thus far has been entirely hand sorting, hand jigging and sacking and shipping direct.

Some of the newest work on the property done by Mr. Wright is a drift on a stringer of sulphides on the opposite side of the hill from the old workings. This drift has proceeded about 150 feet and agrees in strike and dip with the main vein. Mr. Wright calculates that by continuing this drift 700 feet farther he will cut the main vein at a depth of 300 feet.

The property is equipped with an old mill, consisting of a jaw crusher, a small Huntington mill and a Frue vanner.

Total production of the property is not available but 4 tons were sacked and shipped during the past summer, giving smelter returns of more than \$2100.

After further development of the property Mr. Wright proposes to determine the proper mill equipment which will make the best recovery. It seems probable that the entire gouge vein, which averages about 3 feet wide, will be sufficiently high grade for milling.

The ore body has a strike of N. 40° W. About 3000 feet of work has been done to date on the property and the deepest work is only 170 feet on the vein. Vein is reached by a 1600-foot crosscut tunnel and is stoped in some places to the surface.

PERKEYPILE MINE (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Perkeypile mine 6 miles southwest of Gold Hill is in the S. W. ¼ Sec. 5, T. 37 S., R. 3 W., near the top of the ridge between Galls and Foothills creeks. A crosscut strikes the vein at 90 feet and a drift follows it about 300 feet. The vein strikes S. 60° E. and dips 72° S. W.

PHILIPS OR VANGUARD PROPERTY (gold) JOSEPHINE COUNTY

Concerning this property Diller says:

The Philips property, known also as the Vanguard, is on the north slope of Days gulch near Pocket Knoll. Several openings have been made in the hillside and an 80-foot tunnel run in greenstone not far from its contact with cherty slates. Some sulphide ores carrying copper and gold were obtained, although no considerable bodies were visible at the time of my examination. The tunnel is to be extended 500 feet farther into the hill. A small and very crude arrastre on the creek is said to have been used to grind some of the pocket ore from the ridge near the knoll.

PHOENIX MINE (gold) GREENHORN DISTRICT BAKER COUNTY

This mine is located about 1 mile southeast of Greenhorn. The ore consists of coarse granular dolomite with a little quartz and galena. It contains abundant high-grade gold intergrown as small grains with the carbonate. The mine has an 80-foot shaft, 1000 feet of development. A pay shoot 30 feet long, 4 feet wide and containing about \$36 per ton was found but did not hold out in depth. The above statement is taken from W. Lindgren's "Gold Belt of the Blue Mountains of Oregon."

PILGRIM CLAIM (gold) ASHLAND DISTRICT JACKSON COUNTY

The Pilgrim claim, about 3 miles southwest from Ashland, is on the ridge west of Wagner creek, at an elevation of about 3000 feet, in Sec. 14, T.

39 S., R. 1 W. It is now owned by C. Halstead, of Talent. It is opened by an adit drift extending N. 10° E. about 170 feet on a vein containing about 3 feet of quartz in a quartz schist. The vein dips 62° W. At 50 feet from the portal a raise extends upward about 30 feet on the vein to the surface. The country rock has well defined bands, marking sedimentary layers, now much contorted, but in general crossing the adit at a large angle and dipping steeply. A small sample examined microscopically proves to be a fine, even grained quartzite with seams of siderite and disseminated muscovite.

PINE FLAT MINE (copper)**AGNESS DISTRICT****CURRY COUNTY**

The Pine Flat mine is located in the south central part of T. 35 S., R. 32 W., in the Pine Flat copper district, which is situated about 4 miles southwesterly from Agness on the ridge which farther to the south is known as Wake-Up-Riley ridge, and is composed largely of Colebrooke schist.

The copper occurs as thin seams and stains of malachite in jointed and sheared serpentine, near and below the dacite-porphry. The latter strikes N. 80° E. and dips 32° S. E. Two short tunnels have been driven along the serpentine-dacite-porphry contact, and several open cuts have also been made along the same horizon.

The whole occurrence bears a strong resemblance to the shear-zone deposits in the Collier creek district. Whether any high grade ore was found is unknown. A general sample of the ore on various dumps yielded 9.87 per cent of copper and traces of gold and silver.

PLATINA y ORO MINING COMPANY

Articles of incorporation filed December, 1916, by Cordie K. Cadman, Chas. K. Cadman and A. Clinton Vestal, with a capital stock of \$50,000; par value \$10. Office at Marshfield, Oregon.

PLATINUM, IRIDUM AND GOLD COMPANY (placer)**JACKSON COUNTY**

Office: Bandon, Oregon. P. Langdell, Gold Hill, Pres.; J. N. Watt, 621 J St., Sacramento, Cal., Sec.-Treas. Capital stock, \$500,000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company had 4 placer mining claims of 20 acres each, or 80 acres, besides 320 acres adjoining these claims of patented land in Sec. 2, T. 32 S., R. 15 W.

Over \$1000 worth of development work was done on these claims in 1914. The above lands were disposed of in the spring of 1916. The company now has the Crescent No. 4 and No. 5 lode claims in Jackson county.

PITTSBURG DEVELOPMENT COMPANY

This company filed articles of incorporation in 1915. Incorporators: James B. Kerr, Harrison Allen, Omer C. Spencer. Capital stock, \$16,000; par value \$1.00. Office, Portland, Oregon.

POCAHONTAS MINING AND IRRIGATION COMPANY

Office: Baker, Oregon. C. W. Kelly, Pres.; M. E. Roberts, Sec.-Treas. Capital stock, \$2500; par value \$10; all subscribed, issued and paid up. (1916 report).

POOLER'S PROPERTY (gold)**BLUE RIVER DISTRICT****LINN COUNTY**

This property, owned by E. O. Pooler, consists of 1 claim located in Sec. 29, T. 15 S., R. 4 E., about 1/2 mile of trail to connect with mountain road to Lucky Boy mine. Fairly good wagon road to Blue River postoffice. Road from Blue River to Eugene is in good shape. Country is very rugged and plenty of timber is available.

The country rock is andesite. The deposit is of the brecciated zone type with a N. W.-S. E. strike. The property is developed by short prospect tun-

nels and open pits. An 8-foot width is said to assay from \$8.20 to \$13.40 per ton. Some specimen ore has been taken from this prospect, showing wire gold imbedded in quartz crystals. The quartz has the appearance of being formed in small vugs.

It is reported that during the present summer of 1916 more development work has been done, including the installation of a small stamp mill.

POORMAN GROUP (copper) EAGLE CREEK DISTRICT BAKER COUNTY

This property is owned by the Oregon-Idaho Investment Company of Baker, Oregon. The claims are situated in Secs. 32 and 33, T. 7 S., R. 43 E., between Balm and Goose creeks, on a small stream known as Slide creek, which flows through the property into Balm creek.

The topography represents a partially eroded basaltic plateau and is characterized by small streams whose branches head in comparatively short gulches. In this immediate vicinity the basalt caps only the higher ridges and is not of great thickness.

The country rock is for the most part a dense altered greenstone, somewhat brecciated and cut by quartz-calcite gash veins. In some parts it is very siliceous, which may be due to the more acidic composition of the original rock or, as is more probable, to secondary silicification. On account of the obscuring effect of alteration, not much can be said about the original character of these rocks. It is probable, however, that they were trachytes and andesites. For instance, one specimen taken from the outcrop shows a light-colored dense rock cut by veins of pyrite. In thin section it is seen that the groundmass is a confused indeterminable mass of alteration minerals consisting chiefly of chlorite and sericite. Apparently the rock before alteration had a texture approaching closely that of a glass. It can also be seen in the thin section that pyrite is associated with quartz in the veinlets.

The mineralization is in a shear zone having a strike of about N. 65° W., a dip of from 40° to 60° to the south and is from 150 to 300 feet in width. On the surface the red stain of iron oxide is very noticeable, and occasionally there are stringers of hematite from 1 to 2 inches in thickness. Pyrite was found on and near the surface associated with quartz in small veins. At a depth of one to two hundred feet chalcopryite is the chief ore mineral. Many large sized blocks that have been taken from the development drift and crosscuts have had enough chalcopryite in veinlets to contain 7 per cent copper.

These richer portions may, in fact, be considered as a type of quartz vein. This is well illustrated by a specimen from a silicified zone. The rock is intensely silicified and appears to have suffered a brecciation since the silicification, as is shown by the fact that the cavities are partially filled with minute quartz crystals intermingled with chalcopryite. In thin section it is seen that the main mass consists of interlocking quartz grains impregnated with chalcopryite, and also cut by veinlets of chalcopryite. In these veins some chlorite is associated with the chalcopryite.

It seems probable that this brecciated zone in the old greenstones made an excellent opportunity for the replacing action of hot ascending silica solutions, which carried their metallic content, although a certain portion may have been leached from the greenstones. The excess of silica and the presence of gold would indicate other sources besides that of andesitic or basaltic lava.

After the silicification and impregnation of pyrite and chalcopryite, the zone was fractured again and probably a further concentration of the copper took place by circulating or perhaps even descending waters.

The specimens clearly show a brecciation after the silicification, and it is not unreasonable to suppose that where this fracturing is most pronounced there might be found deposits of richer ore.

Development in 1915 was done by the Baker Mines Company under lease and bond, but no new discoveries are reported.

PORPHYRY MILL CLAIMS (gold) SUSANVILLE DISTRICT GRANT COUNTY

These claims are on the north side of Elk creek, about midway between Susanville and Galena. They cover an area to the east of Quartz gulch and north of Elk creek, over what is known as "Porphyry hill." This hill is made up of slate cut by several light-colored, much altered dikes. The dikes have a general E.-W. strike and dip N. into the hill at high angles. Three dikes were noted from 30 to 40 feet wide.

In thin sections these dikes are seen to consist of larger grains of quartz, imbedded in a much finer grained ground mass consisting of quartz, feldspar and sericite. These larger grains are curious in that they do not have a true crystal outline, but appear to be made up of broken fragments. The ground mass is undoubtedly of igneous origin, although some of the quartz and the sericite is secondary.

These dikes are probably quartz porphyries, which after consolidation were shattered at depth. The formation of secondary quartz in the ground mass has obliterated the evidence of shattering, but the large quartz crystals show it in a striking manner. The intergrowth of quartz and feldspar indicates that this porphyry has aplitic tendencies.

Although there has been but little development, ore has been shipped or milled at various times. Shipments of a few tons each have been made that reported gross values from \$80 to \$100 per ton. Ore was treated in an arrastre with returns of \$3162 from 150 tons. This ore came from the slate adjoining the porphyry. At another time from porphyry \$1600 from 80 tons was received; at another time in a Huntington mill 44 tons returned \$7 per ton; later 8¾ tons produced \$237; some 80 odd tons milled from a dump returned \$125; and from another claim 31 tons were arrastred, producing \$5 per ton; and on still another claim a 9-foot channel sample assayed \$4.10.

All the above statements concerning these porphyry deposits were furnished by J. C. Haskell, one of the owners. Channel samples taken by the writer in a tunnel crosscutting a massive and hard part of one of the dikes averaged \$1.80 a ton for 15 feet. It is stated that in the principal workings at the bottom of a winze a rich streak of ore is made up of sulphides similar to those in other parts of the district.

Prospecting in 1916 upon this hill by Haskell and Reiter has disclosed additional stringers of high grade gold ore.

PORTLAND GROUP (gold) WALDO DISTRICT JOSEPHINE COUNTY

The Portland group is located 1½ miles southeast of Holland, and owned by V. C. McKinney, of Holland, Oregon; W. V. Lewis, of Portland, and R. M. Lewis, of Idaho.

The ore deposit is found in a quartz vein which varies in thickness from 4 inches to more than 3 feet.

Development work consists of a shaft 115 feet deep, at the bottom of which is a drift 50 feet each way. There is an adit driven on the vein 350 feet long at about the same elevation as the bottom of the shaft. Considerable stoping has been done from the adit level, the ore body averaging about 2½ feet wide, from which, according to the manager, \$3 to \$4 of gold is saved per ton.

The property has a small Gibson mill of about 20 tons capacity.

PORTOMA MINING COMPANY

IDAHO

Office: 213 Board of Trade Bldg., Portland, Oregon. D. C. O'Reilly, Pres.; F. A. Knapp, Sec.-Treas., both of Portland. Capital stock, \$100,000; par value 5 cents; \$53,000 subscribed, issued and paid up. (1916 report).

This company's properties are in Shoshone county, Idaho.

POWDER RIVER GOLD DREDGING COMPANY (California corporation)
SUMPTER DISTRICT BAKER COUNTY

Office: 433 California St., San Francisco, Cal. W. P. Hammon, Pres.; A. E. Boynton, Sec.-Treas., both of San Francisco; S. O. Correll, attorney-in-fact, Baker, Oregon. Capital stock, \$500,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

The most important placer mining operation in the state is that of the Powder River Dredging Company, located near Sumpter, Oregon. The total holdings of this company is about 1500 acres, of which about 700 acres is to be dredged. This 700 acres of commercial gravel extends from a point a short distance north of Sumpter to McEwen, a total distance of about 5 miles.

The commercial gravel is in a meandering channel from 300 to 2000 feet wide, and averaging about 1000 feet, and occupies only a part of the valley floor. The average depth of the gravel is 18 to 20 feet. The bedrock is a soft decomposed rock, which dredgers call "clay webfoot." Nearly all of the gold is on bedrock, and the condition of the gravel and bedrock is such as to be called quite hard digging. This fact will be better understood when it is known that the manganese steel bucket lips last only 5 months, while in California practice they last about 18 months.

The two dredges are of the standard type and were constructed by the Yuba Construction Company, of Marysville, Cal. On dredge No. 1 the 65 buckets have a capacity of 9 cubic feet each, and on No. 2 dredge 7½ cubic feet each, and the dredges will dig to a maximum depth of 30 feet. The 2 dredges have an actual capacity of about 10,000 cubic yards daily. The dredges have wood hulls, which, according to California experience, have an average life of 10 to 12 years. They have no amalgamating plates. They are equipped with Hungarian riffles, which have a slope of 1¼ inches to each foot of length.

The power is furnished by the Eastern Oregon Light and Power Company. The horsepower required is naturally variable. The consumption averages about 750 H. P. in 7 motors for each dredge.

The clean-up is made weekly, and the high extraction, estimated at 95 per cent, is made upon easily washed gravels, which contain but little clay. The gold is medium coarse. The particles average larger than those in the California dredging field. The largest nugget secured is ⅝x⅜-inch, while perforations in the revolving screen are ¾-inch. It is evident that no nuggets of gold are lost in the oversize. The average fineness of the gold is 785. The total cost per yard is approximately 3½ cents, which is higher than California practice, due largely to the more difficult digging.

Between 100 to 105 acres were dredged from February 1, 1913, to October 8, 1914, a period of about 20 months, or about 60 acres annually. This was done with dredge No. 1.

The company secured in November, 1914, some additional ground, for which negotiations had been in progress for some time. Since this purchase has been effected they began in the spring of 1915 the digging of a pit to install another dredge to work the ground upstream from the point where the present dredge began to dredge the channel downstream toward McEwen. This boat was completed in October, 1915, and has been operated steadily ever since, with gratifying results.

PRINCE EXTENSION MINING COMPANY

NEVADA

Office: 803 Williams Ave., Portland, Oregon. C. B. Garrison, Pres.; W. W. Zallars, Sec.; W. G. Gregory, Treas., all of 512 Board of Trade Bldg., Portland. Capital stock, \$1,000,000; par value \$1.00; \$720,000 capital stock subscribed, issued and paid up. (1916 report).

This company's properties are located in Lincoln county, Nevada.

PRINCE JOHN PLACER MINING COMPANY EAGLE CREEK DIST. BAKER CO.

This company is incorporated under the laws of Colorado. For description see "Eagle Creek Placers."

PSYCHE MINE (gold) GREENHORN DISTRICT GRANT COUNTY

The Psyche mine is about 2 miles west of Greenhorn in the western part of T. 10 S., R. 35 E. It is owned by J. D. Dixon, of Baker, Oregon. It is in serpentine with some altered dolomite. A fine-grained, light-colored sericitized porphyry was also noticed. Considerable development has been done upon this property and a stamp mill was erected, but was removed in 1914. Only the old badly weathered surface workings were visited. At these points the true nature of the mineralization is not very apparent.

It was opened by a 130-foot shaft, a crosscut 300 feet long, drifts and a raise to the shaft level. It has been idle for a few years. It was reported late in December, 1916, as sold to a new company of Baker persons, who expect to do extensive development.

QUEEN ANNE MINE UPPER APPLGATE DISTRICT JACKSON COUNTY

The Queen Anne mine, 10 miles southeast of Applegate, is in the N. E. $\frac{1}{4}$ Sec. 3, T. 39 S., R. 2 W., on Deming creek, near the Sterling placer mine, at an elevation of 2750 feet by barometer. It is owned by W. H. Simmons, who has a mill at the mine consisting of a boiler, engine and 3-stamp battery of 250-lb stamps. It is opened by an adit extending 75 feet N. 20° E. along the bedding of the schistose argillites, which contain some pyrite, but no vein quartz. To the northwest there are 3 shafts, the deepest following a quartz vein for 40 feet. The 4-foot quartz vein strikes N. 45° W. and dips 80° N. E.

QUEEN MINE (gold-copper) LOWER APPLGATE DISTRICT JOSEPHINE COUNTY

The Queen gold and copper mine is about 4 miles northwest of Waters Creek station, on California-Oregon Coast railway, on the divide between Water and Limpey creeks, the former being a tributary of Slate creek. The country rocks are reported to be greenstones, argillites and serpentine by Diller, who says further:

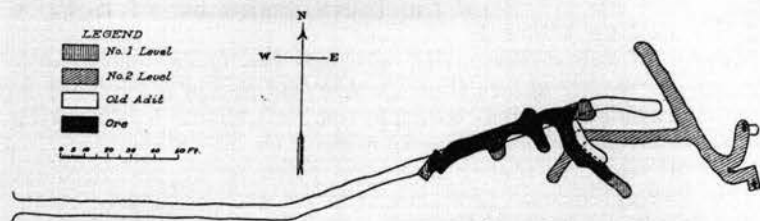
A small placer at the head of one of the forks of Water creek near the contact between greenstone and serpentine yielded \$3000 in gold some years ago and started prospecting to find its source. A number of tunnels and crosscuts aggregating over 800 feet of underground workings have been run in the greenstone. An interesting breccia of greenstone, cemented by quartz and about 12 feet in thickness, is exposed by the tunnel on the Limpey creek side of the divide and may be locally mineralized. Outcrops of this breccia were seen as far west as Slate creek, 2 miles below the Buckeye mine.

QUEEN OF BRONZE MINE (copper) WALDO DISTRICT JOSEPHINE COUNTY

The Queen of Bronze mine is located in the N. W. $\frac{1}{4}$ of Sec. 36, T. 40 S., R. 8 W., about a mile east of Takilma and $2\frac{1}{2}$ miles east and south of Waldo. The land consists of 320 acres patented. The mine was formerly the property of the Takilma Smelting Company, owned by Messrs. Tutt, Hull and McNeil, of Colorado Springs, Colo. Early in 1916 it was sold to John Hampshire, of Grants Pass, Twohy Brothers, of Portland, and associates, and Roy Clarke became manager.

The mine is about 42 miles from Grants Pass, over a well constructed wagon road, with some heavy grades, which add to the difficulty of transportation. Heavy rains in fall and winter make the road almost impassable. At present the railroad point is Waters Creek station on the California-Oregon Coast railroad, a distance of 27 miles.

The company has a 100-ton smelter located near the north $\frac{1}{4}$ corner of Sec. 35, T. 40 S., R. 8 W., which is at the foot of the slope on which the mine is located, and about $\frac{1}{2}$ mile west of the workings. The limestone for the



Chief workings of the Queen of Bronze mine at Takilma, Oregon.

smelter was hauled from the quarry in the N. W. $\frac{1}{4}$ of Sec. 25, T. 40 S., R. 8 W., a distance of about $1\frac{1}{2}$ miles, while coke, as well as all machinery and other equipment, had to be hauled from Grants Pass. The fuel supply was uncertain and in 1907 the works were compelled to import Japanese coke packed in 100-pound bags. The ore was trammed from the mine to bins and hauled to the smelter, a distance of about a mile by the road. The smelter has a 125-ton water-jacket blast furnace operated semi-pyritically, making matte, when in blast averaging 45 per cent copper, 2.5 ounces silver and \$2.50 gold per ton, that is shipped to the Tacoma smelter for conversion.

The equipment of the mine included several boilers, an air compressor, hoist and machine drills. A large amount of development work has been done on the property and mining has been prosecuted by means of tunnels, shafts and open cuts. Large surface ore bodies have been mined by the so-called glory hole method, in which the ore is mined by overhead stoping clear to the surface, passed down a chute and removed through a tunnel below.

Below the open cuts 2 long adits have been driven. The ore from these glory holes was removed through the upper adit. The lower is about 225 feet below the level of the outcrop and is about 1100 feet long.

The ore is massive chalcopyrite, pyrrhotite and some pyrite, together with their oxidation products, such as malachite, azurite, cuprite, chrysocolla and tenorite. Much has been written concerning the occurrence and origin of the copper ores in the Waldo region. Whatever has been the origin of the original ore bodies, whether from magmatic segregation, from solutions related to the cooling of an intrusive magma or from lateral secretion, a more important factor has since been very prominently in evidence; namely, a very marked faulting or shearing movement, which has taken place involving the entire ore body in the fault zone, thus brecciating a wide zone of material, having for one wall the serpentine on the northwest and a less altered basic igneous rock on the southeast. In between these walls is now found a brecciated zone of variable width, in which individual pieces of the brecciated material are often chunks or bodies of massive copper and iron sulphides.

As development of the mine proceeds it is more clearly shown that between these chunks, masses or lenses of sulphides there is no relation one with the other. Their sides strike and dip in every angle or direction and in almost every case are surrounded by mashed or squeezed serpentine.

Winchell describes and identifies numerous more or less basic igneous types of associated rocks, such as andesite, auganite, diorite, augite, pyroxenite and serpentine. The chemical or mineralogical relation of all of these is

not widely different and could be conceived as closely related textural or mineralogical variations of the same magma. According to the observations of the writer, the mashed, altered and squeezed black colored materials in both the Queen of Bronze and Waldo mines, generally known as serpentine, are formed from any or all of the above named list of rocks, which are described in detail by Winchell.

The history of the development of both the Queen of Bronze and the Waldo mines up to date shows that the ore bodies are discovered most unexpectedly and are not in accord with any logical scheme by following veins or stringers, as is the case in most quartz mines. On the other hand, it is evident that any sort of working theory which provides active underground development in this brecciated zone produces at times good results.

If the writer's analysis of the commercially important geological factors is correct, it would seem that the territory in which these ore masses may be found may be quite extensive both in width and depth. A system of drilling could well be inaugurated to prospect this brecciated zone, in which large and small masses of copper sulphide ores are inclosed.

It is said that up to 1910 more than \$150,000 has been spent on the properties, including the building of the smelter, and also that more than 20,000 tons of ore have been smelted, the average content of which has been about 8½ per cent copper, \$3 gold, and the silver usually below 20 cents.

Some good sized ore bodies have been developed during the recent months and several thousand tons have been hauled to the railroad at Water's Creek, some 27 miles from the mine, and shipped to the Tacoma smelter.

QUEEN OF THE WEST MINES COMPANY (gold) (West Virginia corporation)
CORNUCOPIA DISTRICT BAKER COUNTY

Local name, Queen of the West mine.

Office: 209 Pillsbury Bldg., Minneapolis, Minnesota. A. Y. Bayne, Pres.; Lewis W. Campbell, Sec.; H. U. Maurer, Treas., all of Minneapolis; Richard Amidon, Cornucopia, Oregon, Attorney-in-fact. Capital stock, \$1,000,000; par value \$1.00; \$993,466 subscribed, issued and paid up. (1916 report).

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

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

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

The gangue minerals are quartz and calcite containing pyrite, chalcopyrite, galena, and sphalerite in bunches. It is said that the zinc, lead, and copper minerals carry most of the gold values. In many places the vein shows included fragments of altered granodiorite, and the granodiorite on each side of the vein for about 2 feet is badly altered and impregnated with pyrite which is said to contain some values in gold and silver. This vein can be traced for a long distance, reported to be as much as 3000 feet.

Future development plans are to crosscut from the lower tunnel a few

hundred feet beyond the Queen of the West vein, to cut the Red Cross vein whose principal outcrop is some 1500 feet above the lower tunnel. The Red Cross vein is similar to the other veins, but little is known with reference to ore shoots therein.

During the past 2 years (1915, 1916) some development work has been done, and it is said that good ore has been discovered. A new 2-buckel Leschen tram 3300 feet long has been erected. The 10-stamp concentrating mill has been remodeled and enlarged and a complete cyanide plant installed. The general method used is to separate the sulphides with tables and following the tables Dorr classifiers dividing the tailing into sands and slimes; the sands going to leaching vats and the slimes mixed with the concentrates which have previously been ground fine in short tube mills are treated in Pachuca tanks. The mill is well equipped with all accessory apparatus and there are many hydraulic motors installed in order to separately drive different parts of the mill.

This mill is reported to have begun operation late in November, 1916.

RAMSEY MINE (gold) LOWER APPLIGATE DISTRICT JOSEPHINE COUNTY

The Ramsey mine is near the Buckeye and Queen mines in the Slate creek region; the ore at the Ramsey carries gold with little or no copper; the mine is located on the west fork of Slate creek about 6 miles northwest of Wonder and $1\frac{1}{2}$ miles above the forks at an elevation of about 2800 feet, as measured by barometer. The workings are shallow and disclose no regular vein. The ore is due to surface enrichment, and much of it has been treated by placer sluicing methods. The mine is owned by W. H. Ramsey who has an arrastre in which some ore has been treated on the creek just below the workings. According to Diller:

In the upper tunnel the fault contact of the serpentine overlying the greenstone is well exposed, striking N. 25° W. and dipping 62° N. E. That is, however, in a bend of the contact, for the general trend of the contact of serpentine and greenstone is N. 30° E. and the dip is 40° S. E. Some distance west of the contact toward the creek another tunnel has been run into crushed greenstone, and the iron-stained rock has been reported by local assayers to contain a small percentage of tungsten. A sample selected by Mr. Ramsey and myself to test this matter was sent to the laboratory of the Geological Survey where it was tested by R. C. Wells and found to contain no tungsten, but a small fraction of 1 per cent of vanadium.

RED BIRD MINE (gold) GREENHORN DISTRICT BAKER COUNTY

This property 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 and from 6 to 14 inches wide and of high grade free gold ore, which is said to have averaged \$500 to \$800 gold from a few tons which have been milled.

RED BOY MINES COMPANY (West Virginia corporation) GRANITE DISTRICT GRANT COUNTY

Office: Fremont, Nebraska. Ray Nye, Pres.; E. L. Hoppe, Sec., both of Fremont, Neb. F. A. Harmon, Baker, Ore., Treas.; John Thomsen, Baker, Ore., Attorney-in-fact. Capital stock, \$1,400,000; par value \$1.00; \$1,000,000 subscribed, issued and paid up. (1916 report).

The assets of this company, commonly known as the Red Boy mine, were sold at sheriff's sale in Canyon City in January, 1916, for \$34,500 to satisfy a trust mortgage securing a bond issue of \$137,900. The property was bid in for the bondholders who in June, 1916, reorganized the company and filed articles of incorporation as the Red Boy Mining and Development Company, capitalized at \$250,000, under which title a description of the mine is given.

RED BOY MINING AND DEVELOPMENT COMPANY (gold)
GRANITE DISTRICT**GRANT COUNTY**

Local name, Red Boy mine.

Office: Baker, Oregon. Ray Nye, Pres.; Arthur F. Winter, Jr., Sec.; Paul Colson, Treas., all of Fremont, Neb.; F. A. Harmon, Baker, Vice-Pres. Capital stock, \$250,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company is the reorganized Red Boy Mines Company. The total production of this mine is between \$800,000 and \$1,000,000; it is one of the best known mines of eastern Oregon. Its activity at the present time is confined to prospecting in certain parts of the mine and to re-cyaniding some of the low-grade concentrates.

The country rock is a slaty siliceous to calcareous black argillite, originally a mud deposit in quiet waters on the floor of an inland sea. Since the time of its deposition this mud, which aggregated hundreds of feet in thickness, became cemented into a rock that was afterwards subjected to pressure, making it somewhat laminated. Since the elevation is 4600 feet at the mine they have been uplifted since deposition about a mile. The bending, squeezing, slipping or faulting has tilted them to the westward 15 to 20 degrees from the horizontal.

The granodiorite intrusion which now makes up the main ridge of the Greenhorn range, has a northward spur on which is the Ben Harrison mine, about a mile from the main range. This same spur extends northward on the west side of the Red Boy mine. From this spur, as in practically all the other districts, 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, sheet-like 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. This fracturing from one to several feet wide permitted the ascension of solutions from the concealed intrusion from which were deposited the quartz, the sulphides, and the silver and gold. These ascending solutions must have brought the gold and silver from the igneous intrusion, although it may have secured some quartz by leaching from the walls on its upward journey. The shattered dikes and the adjoining argillite which make up the irregular walls of the veins both contain disseminated pyrite. These are undoubtedly deposits from ascending hot waters, which were especially active in their alteration of the aplitic dikes.

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 per cent sulphurets contained in the ore are low grade, from \$5 to \$20 per ton, and probably are largely contained in the slate milled 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.

All of the facts indicate that the ore in the Red Boy mine is primary, notwithstanding the fact that the vein so far developed below the 200-foot level is too low-grade to mine. The ore shoots of good grade above that level are not the result of downward sulphide enrichment, although a superficial examination of the mine maps might cause one inclined to over-emphasize the effects of secondary enrichment to draw such an inference because the stope length of 800 feet is so much greater than its 300 feet of pitch length.

Primary ore deposition is a physico-chemical process which involves many variable factors. Lessening temperature and pressure, different wall rocks from horizon to horizon, mingling of different solutions by the joining of ascending flows of water and the great variability in the velocity of the ascending waters passing through open fissures, filtering through brecciated fragments or stagnating next to impervious layers of gouge, all combine to influence ore deposition or to prevent it in any given place, to give it with a lavish hand or sparingly or not at all.

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 2 veins would cause their junction to pitch to the N.-NE. The maps shows this to be the case.

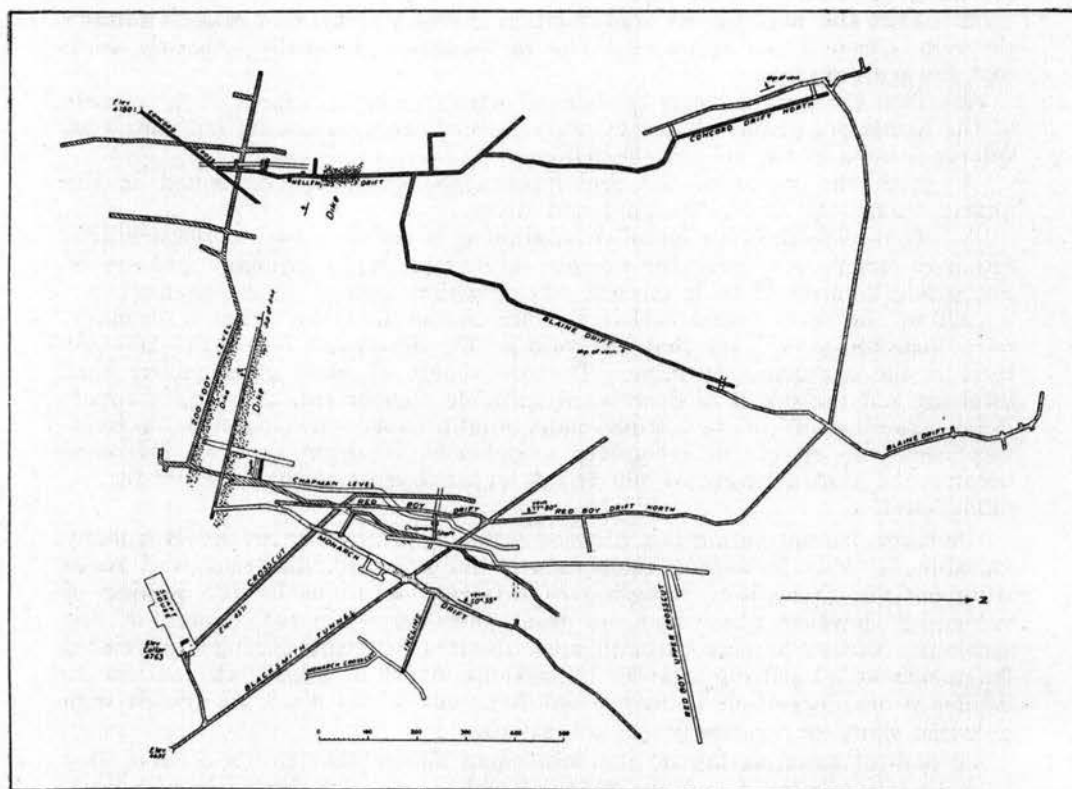
The value of the ore was said to have been maintained, at least as far as the 200 level, but the development from the 200 to the Chapman level and

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 limits of the stopes is the vertical limit of the ore.

Ore might not be found by new development upon the Chapman level. It might be absent upon the Chapman level and be present upon lower ones, or there might be little or no ore outside of that already stoped, due to the effects of one or more of the causes enumerated above, which affect the deposition of ore from ascending solutions in a great variety of ways. All possible shapes of primary ore shoots are apt to be found.

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.



Plan of the Red Boy mine

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 results 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.

RED JACKET CLAIM (gold-copper) GRANTS PASS DIST. JOSEPHINE COUNTY

For description of this property see "Oregon Gold Mines Company."

RED MOUNTAIN PROSPECT (gold) CORNUCOPIA DISTRICT BAKER COUNTY

This prospect is located about $\frac{1}{2}$ mile northwest from the Queen of the West mill in Sec. 21, T. 6 S., R. 45 E.

The eastern end of Red mountain can be seen on the way to Norway basin and to the Queen of the West mill. The rest of it is well observed from the apex of the ridge on the George W. Smith claims where, looking north one can see Twin lakes far below the contact of the lighter colored granodiorite with the darker schist of Red mountain above. Nearly all of this eminence (9500 feet) is bare of vegetation. The rock, of reddish brown color, is almost as solid at the surface as below. Loosened by the action of ice and snow loose rock is not permitted long to remain upon its forbidding walls.

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

The Red mountain vein is situated close to the contact with granodiorite and roughly parallel to it. The outcrop of the principal shoot has an elevation of about 7200 feet, but the vein can be seen for a considerable distance to much higher elevations. It is not a contact vein, although locally so considered. The contact of the "granite" with the schist does not appear to be mineralized, although there are effects which appear in the character of the granodiorite. The roughly parallel attitude of the larger biotite mica crystals gives an appearance of gneissic texture. Many of the large quartz grains are cracked and wavy, evidencing contact stresses.

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

feet is now partially caved. A crosscut (several hundred feet long) at an elevation of 6600 feet, is being driven to cut the vein, but has not yet reached it. It is still in the granodiorite, although it would appear from the nature of the rock near the face of this crosscut that the tunnel is approaching the contact and perhaps the vein. (1914 report.)

RED RIVER GOLD MINING & MILLING COMPANY

MULE CREEK DISTRICT

CURRY COUNTY

Office: Indianapolis, Indiana. Albert Izor, Pres.; Thos. F. Harrington, Sec.; Chas. Lilly, Treas., all of Indianapolis, Ind.; Jonathan Brown, Agent, Marial, Ore. Capital stock, \$1,000,000; par value \$1.00; \$933,800 subscribed, issued and paid up. (1910 report).

This property is reported to be in the possession of Geo. M. Cheney, of Indianapolis, Indiana, and W. H. Corwin, of Marial, Oregon, the sole active bondholders. The former owns most of the bonds and the latter has an option upon the property and is developing it. There are 10 quartz and 10 placer claims. The quartz claims are on Mule Mountain north of Rogue river and west of Mule creek and the placers are on these streams nearby.

There is about 250 feet of tunnels besides open cuts upon the quartz claims on a shear zone in greenstone consisting of many small quartz stringers over a width varying from 10 to 50 feet and averaging 20 feet wide. The value for the full width is said to be about \$3 in gold. The placer claims are on both banks of Rogue river as well as on lower Mule creek. The bedrock is slate and is about 20 feet above the river. The deposit consists of about 30 feet of fairly coarse gravel covered over with 35 feet of fine material. Water is brought to the penstock by a 4-foot flume $3\frac{1}{2}$ miles long which cost \$80,000. From 4 to 8 6-inch giants are used according to season and are operated under 180 feet head. It is said that the gravel averages about 9 cents per cubic yard.

REEDER MINE (gold)

ASHLAND DISTRICT

JACKSON COUNTY

The Reeder mine, about 4 miles south of Ashland, is on the ridge about half a mile northwest of the forks of Ashland creek. It is opened by a lower adit at an elevation (determined by aneroid barometer) of 2900, a second at 3040, and a third at 3320 feet above sea level. The lower adit is a drift 350 feet long on the vein which here strikes N. 45° W. to N. 51° W. and dips about 80° N. E. This vein consists of numerous small fissures and shear zones, somewhat discontinuous, filled with quartz and green siliceous and chloritic material. The country rock of all the openings is tonalite. The second adit is a drift about 180 feet long on the same vein. One wall seems to be a large aplite dike with pegmatitic phases having a very irregular contact with the tonalite. The vein in this working is more clearly defined and averages about 4 feet in thickness. The third adit is about 300 yards northwest of the others on the northeasterly instead of the southeasterly slope of the hill. It consists of a crosscut entry running S. 50° W. for 70 feet to the vein, on which drifts run in both directions, one being S. 48° E. for 40 feet, and one N. 50° W. for 150 feet; the latter is terminated by a raise inclined at an angle of 37° reaching the surface. In this adit fault gouge is conspicuous with a small amount of white vein quartz. Narrow veins of sheared feldspar are characteristic of that portion of the ore which is said to be especially rich. The vein is about 4 feet thick in this adit.

RETAILLAC MINING COMPANY

IDAHO

Office: 695 Multnomah St., Portland, Oregon. Fenton Merrill, 1633 Boylston Ave., Seattle, Wash., Pres.; C. A. Bell, Portland, Vice-Pres.; Paul DeHaas, Portland, Sec.-Treas. Capital stock, \$5000; par value \$1.00; all subscribed, issued and paid up. (1916 report.)

This company's properties are located in Idaho county, Idaho.

REVENUE POCKET (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Revenue "pocket," 5 miles south of Gold Hill on Kane creek, is near the center of Sec. 11, T. 37 S., R. 3 W., nearly at the top of the ridge at an elevation of 2570 feet as measured by barometer. It is about 100 feet east of an outcrop of limestone interbedded with argillite which strikes N. 10° E. and dips 70° E. This "pocket" was worked out years ago; it is said to have produced \$100,000. At present the vein is being explored by Butler and Higinbotham; the vein is opened for about 35 feet and shows about 2 feet of quartz.

REYNOLDS MINE (nickel) WALDO DISTRICT JOSEPHINE COUNTY

Diller says:

A prospect near Rough and Ready creek, about 12 miles northwest of Waldo, with 850 feet of tunnels, lies in the midst of the great serpentine area and has attracted the attention of prospectors for copper. I was unable to visit the prospect, but Mr. Reynolds kindly sent me at my request a series of samples to illustrate the ores of his prospect. The material is much altered and weathered serpentine, stained green by carbonate of copper, together with delicate pinkish or bluish gray tints, suggesting the presence of cobalt. Some pyrrhotite seems to be present, but it is evident that the samples are so altered that they afford an unreliable basis for judging the ores. Both nickel and cobalt have been reported in these ores. Tests by Chase Palmer in the chemical laboratory of the Geological Survey showed the presence of 0.29 per cent nickel, but no cobalt was found.

RICHARDSON CLAIMS (gold) GREENHORN DISTRICT GRANT COUNTY

These claims are located just north of the Morning mine and on what appears to be the continuation of the same dike or else upon a similar one. The light-colored altered porphyry dike here is 5 or 6 feet wide, but has associated with it a 2-foot quartz vein. The values are said to be about the same as the average at the Morning mine.

RICHMOND GOLD MINING COMPANY (gold) GALICE DIST. JOSEPHINE COUNTY

Local name, Richmond group.

Office: Salem, Oregon. B. F. Rowland, Portland, Pres.; Edward Friday, Galice, Sec.-Treas. Capital stock, \$1,000,000; par value 10 cents; \$725,618 subscribed and paid up, \$25,618.50 issued. (1916 report).

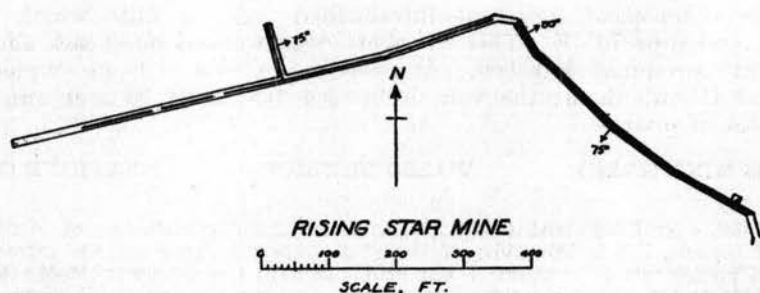
The property of this company is known as the Richmond or Friday group and is located 3 miles northwest of Galice. Concerning it Diller says:

The Richmond group, north of the Oriole, embraces 12 claims in the head of Rocky Gulch and laps over into the head of Deer Lick, a branch of Bailey creek. Seven tunnels, aggregating 600 feet or more, have been run in various directions into the sheared greenstone, exposing some quartz kidneys and veins with but little visible ore. Most of the gold was found with quartz near the summit on both sides of the divide. A ball mill and an old arrastre, both in ruins, were once in operation. The Oriole fault and lode enter the Richmond group, but farther north, near divide, are not so well marked, though quartz veins are more numerous, some striking west of north toward the Golden Wedge, whereas others run east of north toward the Arago. The only work in progress in July, 1911, was on the Deer Lick slope, where an 18-inch rusty quartz vein appears, which is said to assay \$15 to \$20 a ton.

RISING STAR MINE (gold) LOWER APPLIGATE DISTRICT JOSEPHINE COUNTY

The Rising Star mine, 12 miles south of Grants Pass, is in the northern part of Sec. 21, T. 38 S., R. 5 W., about half a mile southwest of the Oregon Bonanza, at an elevation of about 2200 feet, as measured by barometer. The mine is owned by Mr. St. John who has kept the main adit open. The latter is about 1500 feet long as shown in the sketch. The first part of the adit, going northwest, discloses a vein striking northeast and dipping about 75° S. W. which contains quartz varying from 0 to 48 inches thick. The thicker portions have been stoped out. In the second part of the adit, running southwest, only quartz stringers are found, and even these are less abundant near the face. The country rocks here include diorite and hornblende schist. The Rising Star mine was formerly equipped with an air

compressor, a 5-stamp mill with a concentrator, and other machinery, now removed. In 1900 it was owned and operated by the Champion Gold Mining Company. Very little work has been done recently.



Main adit of the Rising Star mine near Powell Creek, Oregon. Main vein in solid black.

RIVERTON MINE (coal)

COOS BAY DISTRICT

COOS COUNTY

Located at Riverton, Oregon, 18 miles southwest of Marshfield and 12 miles northeast of Bandon.

Owned by the Riverton Fuel Company, W. S. Hall, president and manager. This company has taken over the property of the Riverton Coal and Development Company and also Kay brothers' property, and is beginning development on a considerable scale. The new company began operations in September, 1916, and is now working 30 men.

The coal beds have a total thickness of $4\frac{1}{2}$ feet with 2 small partings 2 or 3 inches thick.

This mine is the only one in this district which is located on water transportation, all the coal being shipped by boat on the Coquille river. Preparations are being made for improved bunkers on the river near Coquille whereby transfer can be conveniently made from the boat to the railroad.

ROBERTS GROUP (gold)

GREENHORN DISTRICT

BAKER COUNTY

This group, about 2 miles southwest of Greenhorn, is in greenstone. 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 a drift which has not gone far enough to get underneath the croppings exposed in the open cuts.

ROBERT EMMETT COMPANY

BAKER COUNTY

Office: Baker, Oregon. W. D. Pierce, Pres.; R. D. Carter, Sec.-Treas., both of Baker. Capital stock, \$5000; par value \$100; all subscribed, issued and paid up. (1916 report).

ROBINSON CLAIMS

SIXES RIVER DISTRICT

CURRY COUNTY

See "Smith and Robinson" claims.

ROCK CREEK CLAIMS (placer)

ROCK CREEK DISTRICT

COOS COUNTY

This property, which is owned by Mr. John R. Smith, is situated in Coos county on upper Rock creek, a tributary of Coquille river.

Mr. Smith reached the property in October, 1914, and claims to own by right of re-location 4 placer and 8 lode claims. His title has been disputed by former owners.

He has made and installed 500 feet of sluice boxes, and has done a great deal of additional productive work. He states that 3 men, working with

pick and shovel and often contending with 9 feet of snow, took out \$3500 worth of gold in 2½ months during the fall of 1914. He says that he left the property on January 18, 1915, and freely showed the gold he had recovered. This caused two men to go to the property during his absence and to work thereon without permission from him.

Mr. Smith further claims that he recovered \$2000 worth of gold after his return to the property in the spring of 1915. At the time of this investigation, he was putting in ditches and laying plans to mine the ground on a large scale. He says that the gold is coarse and unworn, and is very pure, averaging about \$19.50 an ounce in value. He has found that it hugs the bed-rock closely.

This property has been worked more or less since the spring of 1915, but as far as can be learned has not yielded according to expectations.

ROCK GULCH PLACER **GALICE DISTRICT** **JOSEPHINE COUNTY**
See "Jewell and Lewis."

ROGERS GROUP (copper) **HOMESTEAD DISTRICT** **BAKER COUNTY**

This group, upon which considerable development was in progress in 1916, is situated about 3 miles below Homestead and in close proximity to the river and about 1000 feet above it at the outcrop. The outcrop is easily observed, since it is decidedly red in color and several feet wide. The development consists in driving crosscuts a few hundred feet to determine the nature of the deposit which has such a pronounced gossan.

It was feared that the tunnel, which was being driven at the time the property was visited in August, 1916, would crosscut the deposit too high above the water table to determine whether or not commercial copper ore would be found at depth.

ROSEBURG AND FIDELITY GROUPS (gold) **WALDO DIST.** **JOSEPHINE COUNTY**

Concerning these claims Diller says:

The Roseburg group of six claims and the Fidelity group of four claims lie about the head of Tennessee Gulch, 3 miles southwest of Kerby, at an elevation of nearly 2,500 feet. These claims cluster about the southwest end of an area of granular greenstone surrounded by serpentine whose relations were not fully determined.

Portions of Tennessee Gulch have afforded rich placers. Claims were taken up and a little arrastre built 40 years ago near the head of the gulch. Two tunnels have been run, one N. 70° E. and the other N. 70° W. near the contact of the greenstone and serpentine. The cellular quartz veins containing free gold are in the greenstone and are approximately parallel to the irregular contact, ranging from N. 50° to 80° E., with nearly vertical dip. Pyrite is the most abundant ore. No distinct trace of copper minerals was observed.

A large tunnel is being run at a considerably lower level. It is already in 170 feet in greenstone and nearing the supposed horizon of the veins which appear at the surface.

ROSSLAND AND DEER PARK MINING COMPANY **ALASKA**

Office: 270½ Washington St., Portland, Oregon. D. Solis Cohen, Pres.; S. W. King, Sec.; W. C. Wortman, Treas., all of Portland, Oregon. Capital stock, \$1,000,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company owns 4 mining claims on Gravina Island, Alaska.

ROYAL DUKE MINING COMPANY **LAKE COUNTY**

Articles of incorporation filed September, 1916, by A. N. Bennett, I. L. Wakefield, C. N. Barrett. Capital stock, \$5500; par value \$1.00. Office, Lakeview, Oregon.

ROYAL WHITE MINE (gold) **GREENHORN DISTRICT** **GRANT COUNTY**

This mine is located about 1 mile north of Greenhorn and is owned by George R. Wiegand, of Greenhorn. It is situated 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 east-west 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.

ROY MINING COMPANY (gold-silver) ASHWOOD DISTRICT JEFFERSON COUNTY

Local name, Roy mine.

Office: Pendleton, Oregon. E. P. Marshall, Pres., Pendleton, Oregon; W. J. Furnish, Portland, Sec.-Treas. Capital stock, \$20,000; par value \$1.00; \$12,648 subscribed, issued and paid up. (1916 report).

This company owns 145.72 acres of patented land in Secs. 30 and 31, T. 9 S., R. 17 E., adjoining the Oregon King mine in Jefferson county. No activity at the property at present. The ore carries silver, gold and copper with silver predominating.

RUBY MINE (silver and gold) GREENHORN DISTRICT GRANT COUNTY

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 crossouts. 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.

RUTH MINE**ASHLAND DISTRICT****JACKSON COUNTY**

The Ruth mine, reached by wagon road, about $2\frac{1}{2}$ miles west of Ashland, is about 500 feet east of Wagner creek, in Sec. 13, T. 39 S., R. 1 W., at an elevation of 2750 feet, as measured by aneroid barometer. The Ruth adit extends from the portal S. 2° E. 90 feet, then S. 5° E. 40 feet, and finally S. 2° E. 20 feet to the breast. At the portal the adit is in the footwall; at 60 to 80 feet from the portal it is in the vein; beyond that it follows a branch or stringer of the vein into the hanging wall. The vein strikes nearly due south and dips about 80° E. It consists of quartz and calcite with some gold and pyrolusite in hornblende rock. Tonalite is abundant in the hills nearby, but was not seen in the adit. The Ruth mine belongs to J. A. Kane, of Talent.

RYAN MINE**GOLD HILL DISTRICT****JACKSON COUNTY**

See "Harth and Ryan" mine.

SALMON MOUNTAIN COARSE GOLD MINING COMPANY**COOS COUNTY**

Office: Myrtle Point, Oregon. C. C. Carter, Pres.; Orvil Dodge, Sec.; E. A. Dodge, Treas., all of Myrtle Point. Capital stock, \$500,000; par value \$1.00; \$275,000 subscribed, issued and paid up. (1914 report).

This company owns 15 claims known as the Salmon Mountain group. It is not known whether or not these 15 claims include the property described under the head of "Salmon Mountain Mine." Dissolved by proclamation in January, 1917.

SALMON MOUNTAIN MINE (gold)**COOS COUNTY**

In the Port Orford folio Diller describes this property as follows:

The Salmon Mountain mine, on the north slope of Salmon Mountain, at an elevation of 2,100 feet, is hydraulic, using water with nearly 200 feet head, brought across the divide from the upper part of Johnson creek. The cut is about 50 feet deep, the same in width, and 500 feet long, with a range of 200 feet in height. It is in rather fragmental material of igneous origin, except at the lower end, where Eocene shales and sandstones occur. Although closed at the present time, it has been worked during the rainy season at intervals for a number of years. When running under good head the mine paid \$75 to \$100 a day and the gold is said to be rather uniformly distributed through the whole mass. This fragmental material of volcanic origin forms a bench with small depressions on the steep slope of Salmon Mountain, and appears to be due to a slide.

The rock is dark, often purplish or greenish, sometimes brecciated, much fractured, and easily goes to pieces. Although much altered, it retains traces of its ophitic structure which connects it with the basalts. Near the upper limit of its exposure, above the bulkhead it, is more solid and is associated with a rock rich in glaucophane, with sandstones and indurated shales bounding it on both sides.

The gold of the mine appears to be derived from small quartz veins, such as have been prospected in the immediate vicinity. Its intimate association with this igneous rock is exceptional and unlike anything else seen in the region. The branch of Salmon Creek which heads near the mine contains much of the same sort of debris in its bed and yields a small amount of gold annually to several miners.

A short distance southwest of the Salmon Mountain placer mine a quartz mine was opened by several tunnels running in a southerly direction into the hill. One of these showed a 2 inch quartz vein, with smaller veinlets, containing besides some pyrite occasional visible traces of free gold. Veins of this sort are found in the pebbles of Cretaceous sandstone which occur in the adjacent Eocene conglomerate, so that the formation of the veins belongs near the close of the Cretaceous.

SAMPSON CLAIMS (gold)**CRACKER CREEK DISTRICT****BAKER COUNTY**

East of the Cracker-Oregon mine and of the usual Cracker creek type.

Nothing has been done recently at this property. A part of F. Wallace White's "consolidations."

SAND GULCH MINING COMPANY SPANISH GULCH DIST. WHEELER COUNTY

Office: Antone, Oregon. A. C. New, Pres.; N. E. New, Sec.; J. E. Derr, Treas., all of Antone, Oregon. Capital stock, \$10,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

SANFORD PLACER MINES COMPANY (placer) (Washington corporation) DOUGLAS COUNTY

Office: North Yakima, Washington. Fred C. Belohlar, Georgian Hotel, Seattle, Wash., Pres.; P. B. Holdridge, North Yakima, Wash., Sec.-Treas.; A. E. Wheeler, Eden, Ore., attorney-in-fact; Chas. L. Lull, managing agent, Eden, Ore. Capital stock, \$50,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company's property is 12 miles west of West Fork station on West Fork creek.

SANGER GOLD MINES COMPANY (gold) EAGLE CREEK DIST. BAKER COUNTY

Local name, The Sanger mine.

Office: Baker, Oregon. F. W. Paine, Pres., Walla Walla, Wash.; J. K. Romig, Sec.-Treas., Baker, Ore. Capital stock, \$2,000,000; par value, \$1.00; \$1,295,146 subscribed and issued; \$2,000,000 paid up. (1916 report).

The Sanger mines of about 600 acres of quartz and placer claims are located in the northern part of T. 6 and 7 S., R. 43 E., on the western side of Eagle creek, in a quartz and placer mining area which has a record of considerable production. There has been little activity outside of small placer mining operations since 1900.

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

The following description of the deposits and the production from the placer mines of Sanger is taken from the work of Waldemar Lindgren, frequently quoted in this report:

The vicinity constituted the old placer camp of Hog'em, and from the gulches leading up to the mine the sum of \$500,000 is reported to have been extracted. The principal vein, called the Summit lode, was discovered in 1870, and actively worked during the following years. In 1874 the production was \$60,000 from ore containing \$16 per ton. Just how much was produced up to 1887 cannot be ascertained, but it is not probable that the amount was very great. In 1887 a 10-stamp mill was built, and in 1889 the production began to increase rapidly. During the four years 1889-1892 the Mint reports give a total of \$813,000 for this mine. Work was discontinued in 1897 and the mine was idle until December, 1900, when preparations were made to reopen it. It is commonly given as \$1,500,000, and this figure is very likely approximately correct.

The developments consist of several tunnels and an incline shaft 400 feet deep. Unfortunately there was no opportunity to examine the deposit, so that the information available is scanty.

The country rock is a black clay slate, containing pyrite near the veins. The latter are well-defined quartz veins, with clay selvage, and dipping at gentle angles. To judge from available specimens, the ore is a normal coarsely crystalline vein quartz, with a little gray calcite. It contains about 3 per cent sulphurets, consisting of pyrite, chalcopryrite, brown zinc blende, and a little galena, together with free gold. On the whole, it has considerable similarity to the ores of many California gold-quartz veins. The principal vein is said to contain three pay shoots. The upper stopes were worked for a horizontal distance of 600 feet, 50 to 100 feet below the surface. The average width of the vein was here 15 inches, and the ore yielded \$20 to \$25 per ton. Below the zone of surface oxidation the vein was from 2 to 4 feet wide and the ore yielded \$12 per ton. If these figures are reliable it may mean that the oxidized vein has been leached and compressed to smaller volume; while the absolute amount of gold remained the same the tenor appeared to be increased by this process.

Development work during the summer of 1916 consisted in making a few open cuts and running some short tunnels in the attempt to pick up the extension of some of the veins. The geologic conditions in this vicinity are such as to make prospecting rather difficult. The older slates have been severely fractured, cut by porphyry dikes and quartz veins, then followed a period of erosion, after which came the later basaltic lava flows. During the period of erosion fragments would naturally break away from the quartz veins and become scattered in the overlying soil. The outpourings of basalt have in a way sealed this material and so caused it to remain in its original condition, or perhaps may have consolidated or altered it to a certain extent. Therefore fragmental quartz might be mistaken for a vein outcrop. Another misleading factor is that both the older rocks and soils may be so altered that they resemble each other. In only one case in the recent development work was a vein observed and that was a very narrow one in the older shales a few inches in width, which had not been traced along its strike.

SANLINORE MINES AND POWER COMPANY

Office: 702 Spalding Bldg., Portland, Oregon. Z. H. Greenough, Pres.; Joseph H. Johnston, Sec.-Treas. Capital stock, \$50,000; par value 10 cents; all subscribed and paid up; \$25,075 issued. (1914 report). Dissolved by proclamation in January, 1917.

SARAH-BELLE MINING COMPANY

JOSEPHINE COUNTY

Office: Kelso, Washington. R. W. Welch, Pres.; W. P. Ely (deceased), Sec., both of Kelso, Wash. Capital stock, \$100,000; par value \$1.00; all subscribed, issued and paid up. (1913 report).

Properties near Golden, Oregon. Dissolved by proclamation in January, 1917.

SCANDINAVIAN-AMERICAN COMPANY GALICE DIST. JOSEPHINE COUNTY

This company installed a dredge to work gravels about 2 miles below the Almeda mine on Rogue river, but it was evidently not successful, as it has not been in operation for several years. It is reported that this company is defunct.

SCHAFER CLAIM

GOLD HILL DISTRICT

JACKSON COUNTY

The Schaffer claim is northwest of the Nellie Wright, 2 miles east of Gold Hill. An adit 150 feet long discloses a vertical quartz vein 4 feet wide near the portal, but lost at the breast; the vein strikes N. 65° W. in tonalite.

SCHEELITE PROPERTY (tungsten) WEATHERBY DISTRICT BAKER COUNTY

Property consists of 5 claims owned by E. D. Morin, Adam Kolb and George Morin, of Baker, Oregon. Located 4 miles from Weatherby on Chicken creek, in about Sec. 9, T. 12 S., R. 44 E. There is a fairly good wagon road from the property to the railroad at Weatherby. The region is hilly and for the most part barren, although timber is at no great distance to the northeast.

Country rock is granodiorite and weathering has taken place, so that no fresh rock outcrops. Scheelite occurs in small quartz veins. The principal one is said to be from 2 to 14 inches wide. It strikes N. 40° W. and dips 45 to 55° to the south.

Development work consists of a prospect drift and short shaft. The shaft, which is sunk in the bed of Chicken creek, is filled with water.

No accurate sampling has been done, so that no information could be obtained in regard to the tungsten content of the veins, which also contain gold, as there has been, and still is, some placer mining in the immediate vicinity.

SCHOLL'S (LOUIS) PROSPECT (gold and copper)**WALLOWA COUNTY**

Located in Sec. 3, T. 1 S., R. 50 E., about 3 miles southwest of Temperance creek (Brockman's ranch). The Snake river canyon is quite rugged here and the prospect is about 1700 feet above the river at an elevation of about 3200 feet. The region is excellent for grazing and there is some timber on the property and more above.

The region is composed of older sediments, altered volcanics (greenstones) intruded by acid porphyry, while the presence of contact-metamorphic minerals seems to indicate that the main mass of the intrusive is at no very great depth. These rocks are overlain by loosely consolidated gravels, which in turn are overlain by basalt.

There are many outcrops highly mineralized with magnetite, epidote and quartz, and some of these may be as much as 100 feet in width. They appear to strike N. 80° E. and have nearly a vertical dip. Where limestone occurs a certain amount of replacement is evident.

Development work consists of 2 short tunnels. In one a 4-foot ledge of pyrite has been exposed and also masses of magnetite intergrown with chalcopyrite and pyrite. It was not possible to determine the shape or size of these deposits and no assay values were available. However, it would seem that this place is worth prospecting, and if a railroad is built along the Snake river these deposits may become of economic importance.

SCHULZ AND AINSWORTH CLAIMS (placer) OPHIR DISTRICT CURRY COUNTY

At the time of the investigation in 1915, R. Schulz and C. Ainsworth were prospecting on the Great Falls and Tender Foot claims below the Ink and Barr placer on Boulder creek. They were doing work under an option from Dan Rowlan, the owner.

In the lower end of this property the bedrock is smooth serpentine, and runs down to a V, so that little gold has been caught there, and they had saved almost nothing during the month while they had been at work. A short distance above their present location, however, there is a flat, toward which they were working, and where they expected to find gold.

The press in 1916 report the finding of much coarse gold upon Boulder creek, either upon these claims or near them.

SCHWARTZFADER (WILLIAM) CLAIM (gold)**UPPER APPLGATE DIST.****JACKSON COUNTY**

William Schwartzfader has a claim east of the famous Steamboat pocket, which has bunches of auriferous quartz in andesite, at an elevation of 3100 feet by barometer. The veins contain a little calcite and pyrite. The ore is treated in Scheerer's 4-stamp mill, located at the Steamboat pocket. So far as seen this ore is the product of surface enrichment.

SEVEN-THIRTY MINE (copper)**GALICE DISTRICT****JOSEPHINE COUNTY**

The Seven-thirty mine is about 2 miles northwest of the Almeda mine and 1 mile west of Rogue river. It is said to have produced good ore, but has been closed for some years. It is now under option by H. B. Wickham, of Galice.

SEVENTY-THREE CINNABAR GROUP (mercury) GOLD HILL DIST. JACKSON CO.

R. H. Spencer, together with his associates, of Portland, Oregon, are now developing a group of claims adjoining the Mountain King, in Sec. 1, T. 35 S., R. 3 W., known as the No. 73 Cinnabar group, which is reported to be a very promising property.

SHEEP ROCK MINE (gold)**EAGLE CREEK DISTRICT****BAKER COUNTY**

Two miles above the mouth of East Eagle creek in Sec. 30, T. 6 S., R. 44 E., is the McGee property commonly known as the Sheep Rock mine. The rocks

in this locality are sandstones and volcanic breccias somewhat tilted. Upon the Sheep Rock claim there is a dike of altered igneous rock 30 to 40 feet wide, which strikes N. 40° W. and dips 50° S. W. There is auriferous quartz on both sides of this dike. The veins are from 10 to 18 inches wide and contain from \$1 to \$3 in gold besides carrying some pyrite and chalcopyrite. The principal veins on this property have a strike from N. 30° to 60° E. and a dip of from 27° to 37° N. W. These veins have gouge and show slickensides on both walls.

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

SHERWOOD OIL COMPANY

CLACKAMAS COUNTY

Office: Sherwood, Oregon. M. C. Young, Pres.; J. E. Morback, Sec.-Treas., both of Sherwood, Oregon. Capital stock, \$25,000; par value \$1.00; \$18,792.50 subscribed, issued and paid up. (1916 report).

The location of its properties is about 5 miles south of Sherwood, Oregon.

SHORTY HOPE MINING AND MILLING COMPANY (gold)

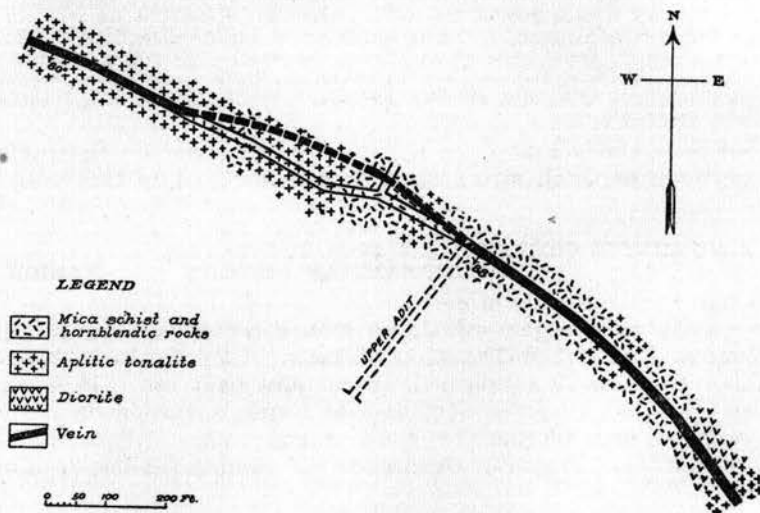
ASHLAND DISTRICT

JACKSON COUNTY

Local name, Shorty Hope.

Office: Ashland, Oregon. H. S. Sanford, Pres., Ashland, Ore.; M. J. Goldner, Treas., Long Island City, N. Y.; T. W. Sanford, Asst. Sec., Ashland, Ore. Capital stock, \$1,000,000; par value \$1.00; \$784,498 subscribed, issued and paid up. (1914 report).

The Shorty Hope mine is in Sec. 12, T. 39 S., R. 1 W., about 4 miles up Wagner creek from Talent and about a mile west of the Ashland mine. The long lower adit of the mine is at an elevation, determined by aneroid barometer, of 2450 feet; it is 1480 feet long and is said to reach a maximum depth of 160 feet; it follows a vein containing shoots of quartz some of which contains some pyrite and a very little chalcopyrite and galena. The vein varies from 3 to 10 feet in thickness; it strikes about N. 55° W. and dips nearly vertically. At 800 feet from the portal a vertical shaft leads to an upper tunnel level communicating with the surface through a crosscut adit 80 feet long. On the upper level drifts are opened on the vein in both



Shorty Hope mine, main adit and upper adit.

directions and some stoping has been done. The country rocks are tonalite, diorite, plagioclite, and biotite hornblende contact rock. Some ore has been obtained from these workings, but the chief efforts of the owners were directed not to removing but to opening up the ore. The mine is equipped with a mill well located on a hillside of enough slope to permit ore to pass through without being elevated. The ore passes over grizzly bars $1\frac{1}{2}$ inches apart to a 5 by 8-inch Dodge crusher placed over a bin from which it is fed by Challenge feeders to 10 stamps of about 1000 pounds weight each. The discharge is through a slotted metal screen of about 20 mesh to silvered amalgamating plates, one being 4 by 11 feet, and the other 4 feet wide and in three steps of 4, 4 and 3 feet respectively. From the plates the ore goes to two Frue vanners, 6 feet wide, which yield a high grade concentrate containing some galena. The mill was operated by water power, but has been used very little.

Other adits nearby give additional data concerning the veins in this region. One opening at an elevation of 2750 feet extends N. 30° W. about 90 feet following a zone of crushed rock about 3 feet thick with some vein quartz. The wall rock is a spotted diorite grading into a dark biotite hornblende rock. A second adit extends S. 24° E. about 120 feet at an elevation of about 2800 feet on the Hope claim; it is supposed to be on the south-east extension of the Shorty Hope vein. The vein here is small; the wall rock is diorite, with a little pegmatite near the portal.

SIERRA NEVADA CONSOLIDATED MINING COMPANY

IDAHO

Office: McKinley Ave., Kellogg, Idaho. S. A. Easton, Pres.; C. W. Simmons, Sec.-Treas., both of Kellogg, Idaho. Capital stock, \$1,000,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company's properties are located in Shoshone County, Idaho.

SILENT FRIEND MINE (gold) GREENBACK DISTRICT JOSEPHINE COUNTY

The Silent Friend mine is located in Sec. 15, T. 33 S., R. 5 W., on the north slope of Post Mountain at the head of Wolf creek, 9 miles east of Wolf Creek station on the Southern Pacific railroad. It is owned by John Scribner, of Wolf Creek, Oregon.

According to Kay:

The chief development has been by 2 adits. The lower of these is 320 feet in length and crosscuts several stringers. The upper is 75 feet in length, and has an upraise to the surface. The country rock is greenstone, which is strongly chloritized adjacent to the veins. The ores are found in veinlets and stringers which run in various directions, but the majority of them have a general trend between southwest and west. The filling consists of quartz, calcite, pyrite, arsenopyrite, and, locally, chalcopyrite. Some specimens of ore, which were found to consist largely of calcite, chlorite, and arsenopyrite, showed considerable free gold visible to the unaided eye.

Mr. Scribner states that from the oxidized material on the surface overlying a network of small stringers he has taken gold to the value of more than \$7000.

SILVER KING MINING COMPANY (gold, silver, lead and zinc)

NORTH SANTIAM DISTRICT

MARION COUNTY

Local name, Silver King mine.

Office: Albany, Oregon. J. J. Langmack, Pres., Gerlinger Bldg., Portland.; Wm. S. Risley, Sec.-Treas., of Albany. Capital stock, \$500,000; par value \$1.00; \$303,412.75 subscribed, issued and paid up. (1916 report).

Property located 10 miles northeast of Gates, a station on the Southern Pacific railway, and reached by good wagon road. About 3 miles from Elkhorn postoffice. Property consists of 12 mining claims, totaling about 240 acres.

A small quartz vein in andesite is exposed by a shaft reported to be 80

feet deep, nearly full of water at the time it was visited. The vein as exposed on the surface is 15 to 18 inches wide, containing considerable sulphide minerals, such as pyrite, galenite and sphalerite.

The greater amount of development of the property, however, is on the more or less mineralized shear zone several hundred feet up the mountain to the north, and known as the Queen of the West. It has a general strike N. 60° W. and dips about 60° S. W., and is well exposed in the bed of Henline creek, which is described as follows by C. W. Riddell in an engineer's report and printed in the company's prospectus:

At the outcropping the mineralized area extends 130 feet in width, with 26 inches of well mineralized quartz on the foot wall and 36 inches on the hanging wall. The intervening distance between the walls is filled with crushed and highly kaolinized country rock, with quartz stringers through it, all showing mineralization, but not opened up sufficiently for sampling. The development comprises two drifts, one on each side of Henline creek. The one on the east side being driven on the hanging wall 70 feet into the mountain, giving a vertical depth of approximately 60 feet. The showing in this tunnel is along the quartz vein on the hanging wall, and disclosed movement after the formation of the vein and the mineral deposition. The values have largely been leached by descending waters. The drift on the west side of Henline creek cuts through a portion of the kaolinized country rock to the hanging wall, which it then follows for about 65 feet. This does not reach below the oxidized zone, and shows that the mineral values have been leached.

The sulphide minerals are pyrite, galena and sphalerite. The channel sampling done by C. W. Riddell in the west drift was over an average width of 36 inches for 10 samples which averaged \$1.20 in gold, 15.3 ounces of silver not discarding 2 high assays, from 3 to 4 per cent of lead and about the same of zinc in the samples which were assayed for zinc.

The work recently has been confined to driving a crosscut to the Queen of the West vein, the portal of which is at the foot of a cliff about 600 feet below the drifts above referred to and about 1000 feet from the point where it is expected the vein will be cut. This crosscut is in now about 100 feet.

SIMMONS PLACER**WALDO DISTRICT****JOSEPHINE COUNTY**

See "Logan, Simmons and Cameron" mine.

SIMMONS PROSPECT (gold)**CORNUCOPIA DISTRICT****BAKER COUNTY**

Simmons mountain is a long ridge between the east and west forks of Pine creek. It is on the northern or right hand side of the west fork, while "Granite" or "Cornucopia" mountain as it is locally known, is on the south or left hand side. This mountain, although of lesser elevation than the "granites" to the south, has extremely precipitous slopes, particularly the southwest portion. Readings taken with a clinometer near the principal outcrop of the Simmons' vein to the stream 2000 feet below gave a slope in excess of 40°.

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

The principal vein of the Simmons group has a strike 25° to 30° N. W. It has a flat dip to the east rarely exceeding 30° and more often much less. The principal vein has been traced on the west and north sides of the mountain for more than 2000 feet. It is, however, where exposed, for the most part too small to make ore unless of high grade. A great deal of work has been done on the croppings so that its width at almost all points can be easily seen and measured. The exposed part of the vein of workable size, unless some of the narrow portions should have very rich ore of which we have no

information, is about 350 feet long, the maximum width a little more than 4 feet, the minimum 18 inches; the average width would not exceed 3 feet for this distance, perhaps a little less. The vein consists chiefly of quartz with small amounts of feldspar. Probably less than 1 per cent of the sulphide minerals, chalcopyrite and galena, are present in thin streaks near the center of the vein.

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

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

In 1915 the property was under lease and bond to the Baker Mines Company. Drifting was continued on the vein. It was reported locally that the shoot of ore in the drift was found to equal the outcrop in size and value. However, the company decided to give up the lease and it is now reported that the owners have made a working arrangement with George W. Smith, who has been driving a crosscut to reach the ore upon the opposite side of the apex of the mountain from where the shoot of ore, discussed in previous paragraphs, is located. Some difficulty in holding the ground has delayed the work of crosscutting so that the objective point has not been reached.

SIPE (JAMES B.) MINING COMPANY (gold) CRACKER CREEK DIST. BAKER CO.

Local name, Buckeye mine.

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

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

The tunnel next below, or No. 3, about 300 feet below the one above, followed a branch fissure for at least 1000 feet before crosscutting back to the main ledge, which was finally encountered late in 1914. Development in 1915-1916 was continued upon No. 3 level.

SIXES BEACH PLACER**SIXES RIVER DISTRICT****CURRY COUNTY**

Diller describes this mine as follows:

The Sixes mine is located about $2\frac{1}{2}$ miles south of Denmark, near the line between Secs. 27 and 34, T. 31 S., R. 15 W., and is operated by Mr. W. P. Butler of Lakeport, Cal. Like the Blanco mine, it lies along the eastern border of the coastal plains, at an altitude of nearly 200 feet above sea level. The mine covers about an acre and has a depth below the surface of about 12 feet, exposing along the eastern border the following section:

Section of the Sixes mine, $2\frac{1}{2}$ miles south of Denmark.

	Feet
Surface material, wind-blown sand and soil.....	5
Gray sand with boulders.....	2
Black sand with boulders.....	$2\frac{1}{2}$

The whole $9\frac{1}{2}$ feet of material is more or less distinctly stratified and dips gently westward, away from the shore, which is formed of crushed sandstone and shale of Cretaceous age. This bedrock series is well exposed in the eastern portion of the mine and contains rock oyster borings. The decomposed fine sediments yield tough bluish clay, which on the surface for 6 inches or so is stained reddish and becomes more granular, affording a good bedrock for mining. The gravel is washed into pool and raised 15 feet by a hydraulic elevator to get drainage for sluicing and tables. Much of the gold is fine and is associated with platinum metals in sufficient quantities to make the saving of them a matter of some importance.

The lack of adequate water supply and good drainage renders mining so expensive as to retard the development of hydraulic mining along this promising old beach. It would seem to be an encouraging locality to test by a modern dredge.

SIXES MINING COMPANY (placer) (Utah corporation)**SIXES RIVER DISTRICT****CURRY COUNTY**

Local name, Divelbiss property.

Office: 743 West Third St., Salt Lake City, Utah, and 625 Market St., San Francisco, California. L. R. Eccles, Ogden, Utah, Pres.; C. B. Edington, Salt Lake City, Utah, Sec.; John Pingree, Salt Lake City, Utah, Treas.; A. H. Thomas, Denmark, Ore., Attorney-in-fact; W. A. Bechtel, San Francisco, Cal., Managing Agent. Capital stock \$1,125,000; par value \$5.00; \$789,500 subscribed, issued and paid up. (1916 report).

This company has an option on a number of claims originally owned and worked by the Divelbiss family. They first gave an option on the property to C. Inman who transferred his interest to the Sixes Mining Company, and now has no interest in the property. Diller describes the claims owned and once operated by N. C. Divelbiss as follows:

The most extensive (of the placer mines then being operated below the forks of the Sixes), operated by N. C. Divelbiss, is on the left bank in the sharp bend two miles above the mouth of Edson creek, and covers a large part of an acre. The gravel bank, worked by water under pressure, is fifty feet high and rests on Cretaceous sedimentary rocks. Farther west, near the mouth of Edson creek, on the right bank, is an upper terrace of large extent which has been mined on the edge, but with scarcely sufficient success to warrant the fluming necessary to supply the water that is needed to do the work satisfactorily.

Diller also states as follows relative to the platinum content of this ground:

In order to get a clew to the source of the platinum (in the beach placers), if possible, concentrates are obtained from the placer mines at several points along the Sixes. Ascending the river, the first was obtained from Mr. N. C. Divelbiss's mine on the left bank of the stream about three-quarters of a mile above the mouth of Dry creek. The sample submitted contained the concentrates from a clean-up after removing the gold. It weighed about 22.87 grams, of which 5.78 grams (about 25 per cent) were separated by the magnet. Platinum scales were found rather abundant, and non-magnetic, so they remained in the non-magnetic portion. The scales generally were very small, but one well-rounded by attrition weighed .03 grain. The scales are generally malleable and sectile and of steel gray color, distinguishable from the nearly tin-white and almost brittle scales of iridosmine, which are about one-third as abundant as those of platinum. In the estimates given below the platinum and iridosmine are counted together. The residue was passed through a series of sieves ranging in size from 60 to 100 mesh per inch, separating it into six lots which were then panned out. Nearly all the platinum was caught in the 60, 80 and 100 mesh. The total yield was .384 gram—about .0168 per cent of the total sample examined. A ton of such sand containing the same proportion would have about \$7,500 worth of platinum alone. This material is highly concentrated, and there is no means of determining how many cubic yards of original gravel it represents, so that the value of the platinum per ton of gravel

is unknown. Besides magnetite, the other minerals are chiefly chromite and ilmenite, with much zircon, epidote, and garnet and a trace of cinnabar.

Another sample of concentrates from the same mine, weighing 60 ounces, contained platinum at the rate of about \$17.00 a ton, and the gold was about seven times as abundant as the platinum, but in this case as in the first the amount of gravel represented by these concentrates is unknown.

In order to get an idea of the relative values contained in the gravel of the mine, the concentrates from two pans of gravel next the bed rock were obtained from Mr. N. C. Divalbiss. They contained 32½c in gold, but no platinum was found. Two pans of gravel from 25 feet above the bed rock contained 3c in gold and no platinum.

Mr. W. A. Bechtel, of San Francisco, the general manager of the Sixes Mining Company, very kindly furnished the following information about the work being done, under date of May 26, 1916:

Location: The Sixes Mining Company is operating on the Sixes river in Curry county, Oregon, about 11 miles from Port Orford and 70 miles south of Marshfield, on what is known as the Divalbiss property, approximately 300 acres.

Water Rights: The water rights of both the Little and Big Edson creeks have been obtained and their waters are being confined by a dam on the Big Edson, and will be used in mining operations on this property.

Flume: The Sixes Mining Company has constructed a very substantial 3'x4' flume, 4½ miles in length, from the above mentioned reservoir. This gives a fall of sixteen feet to the mile, and delivers water into the penstock with a 296' head, measured from bed rock. We avoided construction of ditches on account of the porosity of the soil; in fact, from the very nature and ruggedness of the country traversed by the flume, we decided it would be more economical to build a flume and thus avoid the loss of water which generally occurs in ditch lines, to say nothing of the annoyance and loss of time.

Channels: We have three distinct channels traversing this property, but the magnitude of these is not clearly defined as much of the surface is covered by a heavy growth of timber. The first channel, the present bed of the Sixes river, varies in width and depth. We expect to sample and prospect this channel methodically this coming season in an endeavor to determine the value of the gravel. Mining here will be done with dredges, which will be operated by electric power developed by the same water as is now being used in washing on the second channel. The second channel is now being washed with water taken from Edson creek as before mentioned. We have found this channel to be 100' wide from rim rock to back wall, with a depth of 55 feet of gravel and a layer of well packed sand about two feet thick and 25 feet above bed rock. We have encountered no heavy boulders, and found it possible to handle this material very satisfactorily. We have found excellent values in the first six feet of blue gravel on the bed rock, with profitable values to the grass roots. The third channel lies above the second channel, but its extent has not been fully ascertained. It has been prospected, however, and seems to carry very good values. In fact, uninterested people maintain that this channel carries better values than either of the other two.

Operations: We have been operating for the past thirty days using one giant with a 6-inch nozzle. This supplies our present sluice flume with as much material as it will carry with best results. This "run" is in the nature of an experiment to determine the best methods to be employed to save the values existing in our grounds.

Gold, Platinum and Black Sands: We find that our property contains much black sand and platinum; and our earlier prospecting indicates that at least 10% of the values are in platinum. The black sands have received much attention and study from everybody who has tried to work in this district, since it has been found difficult to extract the gold and platinum contained therein. We have devised a method for doing this which, if it proves successful, will be given to the mining world in general, for we realize that the extraction of the values in this material has been a stumbling block to the success of many mining companies. The gold in our property runs better than \$18.00 per ounce, as determined by many assayers' reports. It is what is known as fine gold, nothing of nugget size having yet been found. The largest grains are about the size of a kernel of rice and are usually considerably flattened. The superintendent of our property is of the opinion that he will catch most of the gold in the first three or four riffles. We are, however, using undercurrents for additional production.

SMITH AND ROBINSON CLAIMS (placer) SIXES RIVER DIST. CURRY COUNTY

M. A. Smith and J. B. Robinson own 3 claims at the mouth of Rusty creek in Sec. 27, T. 32 S., R. 12 W., where it flows into the south fork of Sixes river. These are the Big Nugget, located in 1915, and the Big Foot and Nut Wood, located the previous year. The owners were ground-sluicing in the bed of Rusty creek, and they claimed to have recovered \$14.60 in gold at the date the examination was made.

SMITH (GEORGE W.) CLAIMS (gold) CORNUCOPIA DISTRICT BAKER COUNTY

These claims are situated about 1 mile north of the Jackley claims near the northern end of Granite mountain and at the head of Little Eagle creek in Sec. 19, T. 6 S., R. 45 E. The elevation of the shallow workings is from 9000 to 9500 feet. The latter elevation is that of the mountain ridge.

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

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

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

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

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

SNAKE RIVER MINES COMPANY (gold) CONNOR CREEK DIST. BAKER COUNTY

Local name, The Schist Property, formerly the Runner claims.

The property of this company is located in Sec. 33, T. 11 S., R. 45 E., about 3 miles by wagon road from the railroad (19 miles north of Huntington). This part of the canyon is quite rugged and the hills are covered with bunchgrass and sagebrush. The property is about 1600 feet above the river, which has an elevation of about 1900 feet above sea level.

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

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

On this property the schist is cut in many places by quartz veins a few inches wide, from which branch minute reticulate veins impregnate the body of the schist. Samples taken of the country rock all show the presence of gold. It is probable that this metal is contained in the minute stringers, while

the unaltered schist is barren. The quartz and gold were deposited in the shattered schist from ascending solutions coming from the underlying cooling magma. In this case apparently the values have been disseminated widely through the schist. The limits of the gold-bearing schist have not been determined in 2 crosscuts which are being driven upon the property.

This property is being developed by several hundred feet of tunnels and drifts. In general the values vary from 40c to \$3, with a few as high as \$7 and \$14 per ton. From a glance at the assay map (July, 1916) it appears that (excluding the high assays) an average value of \$1.75 per ton is attained.

A test mill of 75 tons per day capacity has been built, which crushes with Chilian mills and cyanides the slimes.

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

SNAKE RIVER MINING AND MILLING COMPANY (copper)

HOMESTEAD DISTRICT

BAKER COUNTY

Local name, Koger Group.

Office: R. D. No. 2, box 218A, Pasadena, California. J. H. Schneider, Pres.-Treas.; Mrs. J. H. Schneider, Sec. Capital stock, \$300,000; par value \$1.00; \$219,105 subscribed, issued and paid up. (1916 report).

This company has many claims located in the basin northwest of the Iron Dike, about 1 mile from Homestead, in Secs. 8, 9, 16 and 17, T. 6 S., R. 40 E. The same types of dense greenstones are found here, which have scattered through them small amounts of pyrite. In contrast with the Iron Dike, this property has but a slight amount of faulting and no shearing.

SNAPSHOT CLAIM (gold)

ASHLAND DISTRICT

JACKSON COUNTY

The Snapshot claim, formerly called the Cleveland, is located on Wagner creek, near the north side of Sec. 23, T. 39 S., R. 1 W., at an elevation of about 3000 feet, and about 1 mile southwest from the Ashland mine. It is now owned by R. W. Dunlap, of Ashland. It is opened by an adit about 50 feet long running N. 31° W. in tonalite on a quartz vein varying in thickness from 1 to 4 feet. A branch vein or stringer joins the main vein at 20 feet from the portal. The latter strikes N. 20° W. and dips about 56° E.-N. E., while the former has a strike of N. 20° W. and a dip of 66° E.-N. E., and carries quartz and pyrrhotite. The tonalite adjoining the vein is much mineralized in some places. Another adit on the same claim was not visited.

SNOW CREEK MINING COMPANY (gold and copper) GREENHORN DIST. BAKER CO.

Local name, Snow Creek mine.

Office: 2104 Court St., Baker, Oregon. Henry B. Smith, Bay City, Mich., Pres.; Chas. H. McColloch, Baker, Sec.; Robt. J. Davison, Bath, N. Y., Treas. Capital stock, \$200,000; par value \$1.00; \$132,000 subscribed, issued and paid up. (1915 report).

In Sec. 16, T. 10 S., R. 35 E., at the head of Snow creek, is the Snow Creek mine. This mine has a 10-stamp mill and 3 vanners, an 80 H. P. steam plant, and is developed by a vertical shaft 225 feet deep and 1315 feet of drifts, which disclose a fair sized shoot 300 feet long. It has been under water for a few years.

SORBECK PROSPECT

BAKER DISTRICT

BAKER COUNTY

On the west side of the tributary to Washington gulch near the center of Sec. 27, T. 9 S., R. 39 E., a considerable amount of work has been done in a branching tunnel which cuts various types of rocks—limestone, chert, greenstone, and a black tuffaceous rock. The latter carries a small amount of pyrite, which tarnishes to a bright yellow, indicating probably a small copper content. Several small fault zones with clay gouge occur in these workings.

and one small vein of quartz was noted. A detailed study of this prospect, which contains in all over 1200 feet of tunnel working, was not made.

SORDY'S (HARRY) CLAIM GALICE DISTRICT JOSEPHINE COUNTY

Harry Sordy's claim is about half a mile north of the Oriole, at an elevation of 3000 feet, as measured by barometer. It is N. 31° W. of Galice at least 2 miles. The vein is opened by an adit and several shorter workings. The former is about 150 feet long, and the vein, in small lenses, strikes N. 40° E. and dips 55° northwest. The country rocks are serpentine and greenstone. This claim was formerly owned by John Carlson.

SOUTH GEM MINE (gold) SUSANVILLE DISTRICT GRANT COUNTY

This claim is on the same vein as the North Gem and lies immediately south of it. It has a shaft 100 feet deep, with about the same width of vein as at the North Gem, to which the reader is referred.

SOUTH POLE CONSOLIDATED GOLD MINES COMPANY CRACKER CREEK DISTRICT BAKER COUNTY

Out of business.

SOUTH POLE MINE (gold) CRACKER CREEK DISTRICT BAKER COUNTY

See "Columbia Gold Mining Company" for description.

SOVEREIGN CONSOLIDATED COPPER COMPANY (copper) EAGLE CREEK DISTRICT BAKER COUNTY

Local name, Sovereign mine.

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

Six miles west of Sparta, in Sec. 23, T. 7 S., R. 43 E., in timbered area. Elevation 4000 feet. Wagon road to Baker, 25 miles. Lands, 3 claims. Dormant.

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

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

SOWELL MINE WALDO DISTRICT JOSEPHINE COUNTY

See "Kerby Queen (or Sowell)" mine.

SPAULDING MINE (placer) UPPER APPLIGATE DISTRICT JACKSON COUNTY

The Spaulding mine, 7 miles by wagon road southwest from Jacksonville, is on Forest creek, in Sec. 4, T. 38 S., R. 3 W., and is owned by John Davies, of Jacksonville.

The maximum thickness of the deposit in the present workings is more than 40 feet, but the average thickness does not exceed 25 feet. The lowest 10 feet consists of gravels containing boulders; the upper part of the deposit is hardpan. Even in the lower part there are but few boulders, and these are usually less than 1 foot in diameter. They are rounded or subangular and are usually of greenstone, although some are of granodiorite. The mine is equipped for hydraulicking.

SPENCE MINE (gold) WALDO DISTRICT JOSEPHINE COUNTY

The Spence property is in Sec. 19, T. 40 S., R. 7 W., 2½ miles east of Takilma. The size of the dump at the main adit indicates 500 feet to 700 feet of workings. It could not be entered because of a cave near the portal. The ore on the dump is chiefly pyrite. A 60-foot tunnel in the vicinity is a

crosscut and does not show any ore. Another tunnel not examined is said to be 200 feet long and shows somewhat better ore than that on the dump of the long tunnel.

SPOKANE GROUP (gold)**GALICE DISTRICT****JOSEPHINE COUNTY**

The Spokane group is near the head of Rich gulch, at an elevation of about 2200 feet, as measured by barometer. An adit extends N. 10° W. about 190 feet in a serpentinous rock, containing irregular kidneys and stringers of pyritiferous quartz, associated with a fault marked by soft gouge. The foot-wall of the lode is a garnetiferous mica schist. The group is owned by Robertson and Sutherland.

STANDARD MINE (gold, copper, cobalt)**QUARTZBURG DIST.****GRANT COUNTY**

On the east fork of Dixie creek, less than a mile above the junction, in Sec. 12, T. 12 S., R. 33 E., is the Standard copper mine, located on the east side of the creek, and for some few hundred feet above.

The country rock is made up of a series of old volcanic flows. In many places these have an amygdaloidal texture, in which calcite is the chief filling material. Dark, finely granular dense flows are also present, made up of much andesine feldspar, and considerable uraltic hornblende, with some sericite and chlorite, which probably makes it an altered uraltic andesite.

On top of the ridge, above the mine workings, is a fine-grained, light-colored altered dike about 50 feet wide, which has a ground mass of badly formed intergrowth of quartz and feldspar. Its mineral composition indicates the parent granodiorite below. Its texture indicates it to be a granodiorite porphyry grading into aplite.

There are several developed veins on the property. These veins strike approximately N. 70° E. The most important are the Juniper and Standard veins. The Juniper vein is steep dipping and has a maximum width of about 2½ feet, and is of the replacement type with quartz and calcite as gangue minerals in with the altered country rock in the vein. The ore minerals are chalcopryrite, pyrrhotite, pyrite and some smaltite. These sulphides occur in small lenses with chalcopryrite as the chief sulphide. It is said to carry \$3 in gold per ton. It has been developed by 120 feet of tunnel and has been traced by means of prospect pits for about 1000 feet.

The Standard vein has a dip of a little over 50° S. and in widths up to 10 feet. The mineralization of this vein is similar to that in the Juniper. It is said that lenses of sulphide 100x50x5 feet have been stoped. It is developed by three tunnels about 100 feet apart, 700, 1200 and 1300 feet long, respectively, all of which are connected by raises.

The Willie Boy vein, farther to the eastward, contains a small rich stringer of the usual minerals, but besides the massive cobalt di-arsenide, smaltite, there are small crystals of safflorite scattered through chlorite. Safflorite is identical in composition with smaltite, but crystallizes in the orthorhombic instead of the isometric system.

It is probable that these veins were formed by hot ascending solutions which were the last action of the intrusive mass at depth. The veins are of the replacement type, and the influence of the wall rock was probably an important factor. The mineralization is unique in that cobalt minerals are present. Although the region is somewhat weathered, it is doubtful if there is much secondary enrichment.

These veins have been practically worked out to the level of the creek. Large croppings of a lode into which these small veins lead appears to be many feet wide, but no development was observed upon them. These wide N.-S. croppings of quartz and partially replaced country rock contain bunches of chalcopryrite within a foot or two of the surface.

A great deal of money has been expended upon this property, which closed down in 1907, after operating the mill for 6 months. Development work was started again in the spring of 1914 by new owners and was continued in 1915 and 1916.

STAR GOLD MINING COMPANY (gold) ASHLAND DISTRICT JACKSON COUNTY

Office: Oswego, Oregon. J. W. Bickner, Pres.; H. B. Bickner, Sec.-Treas., both of Oswego. Capital stock, \$500,000; par value \$1.00; all subscribed and paid up; \$340,150 issued. (1916 report).

This company owns 14 claims about 5 miles west of Ashland, in the Wagner creek district. The company has done only a limited amount of development work to date. They expect to proceed with this work the next year on an extensive scale, so as to bring the property to a paying basis.

STAR MINE (gold) GREENBACK DISTRICT JOSEPHINE COUNTY

The Star mine is in the S. E. $\frac{1}{4}$ Sec. 7, T. 34 S., R. 5 W., about half a mile south of Placer. It was opened by two shafts about 250 feet apart, but as the workings are full of water no examination was possible. From the dumps and trenches the vein evidently strikes about east and west in a greenstone country rock, while the ore is gold-bearing quartz.

STARR (McKINLEY) GROUP (copper) GOLD BEACH DISTRICT CURRY COUNTY

This group is located about 7 miles south of east from Gold Beach at an elevation of 3950 feet, as determined by the barometer. It was originally located as the McKinley group by Col. I. E. Munsey about 1893. He held possession of the property until he died in 1912. The property was re-located in 1915 by Charles Starr, Harriet Starr, R. G. Starr and J. R. Stannard, all of Gold Beach, who now hold 15 claims. It is reported that Col. Munsey was offered \$60,000 for the property, but that he considered it worth \$6,000,000, and would not consider the lower figure.

As previously stated, the country rock is serpentine, but at least one lens of Colebrooke schist exists in the vicinity, and some greenstone occurs west of the property. The main mass of Colebrooke schist lies not far to the east.

On the Starr No. 2 claim, above the trail, a cross-cut tunnel 275 feet long has been driven N. 60° E. No ore is shown in this opening. It was undoubtedly put in for the purpose of cutting at depth the deposits outcropping above the mouth of the tunnel.

The first cut above the tunnel measures about 15 by 10 by 6 feet. The deposit is a shear-zone in serpentine and shows considerable copper carbonate or iron-stain in the cracks. A general sample from the dump yielded 8.18 per cent copper and no gold.

North of the last mentioned opening is an open cut 30 or more feet long, 15 feet wide, and 12 feet deep. In this is exposed about 12 feet of sheared serpentine stained in the same way as is the deposit described in the last paragraph. A sample carefully cut from across the whole mass yielded 3.17 per cent copper, 1.61 oz. gold, and .27 oz. of silver per ton. A little chalcocopyrite (copper-iron sulphide) was present in this ore, and the amount would doubtless increase at greater depth. The high proportion of gold is an unexpected feature which may lead to interesting developments.

Above the cut just mentioned is the large open cut or pit, 40 feet in diameter. In this occurs a highly iron-stained, porous gossan to a depth of about 5 feet. Then comes massive sulphide ore for a foot or two; while beneath this is limonite-stained serpentine. The sulphide ore consists of chalcocopyrite and pyrrhotite (monosulphide of iron), which latter has a peculiar fibrous appearance. A sample of the gossan proved to contain no gold, as was also true in the case of the limonite-stained serpentine below the sulphide. The sulphide ore yielded 5.1 per cent copper, but no gold or nickel.

A tunnel has been driven directly beneath the open pit just described. It runs S. 45° E. for 20 feet, then gradually curves to the southward for 55 feet so as to bring the breast directly below the pit and at a depth of no more than 10 or 15 feet beneath the material there exposed. Near the mouth this tunnel cuts a copper-stained sheared zone from which considerable ore has been taken. A conical pile of this material, 4 feet high and 12 feet in diameter, was sampled and proved to contain 1.04 per cent copper and no gold. It is but fair to state, however, that this ore gave evidence of considerable leaching and it is not unlikely that the grade was considerably higher when it was mined. This material, as well as one or more copper-stained shear-zones, are exposed in a trench 250 feet long north of the tunnel and open pit.

The open pit and tunnel described in the preceding paragraph are of especial interest as here we seem to have pretty conclusive proof of the boulder-like nature of the deposit of copper ore. No one can doubt for a moment that the material is in place, and yet, within a depth of a few feet, an ore running better than 5 per cent copper gives place to fresh, unstained serpentine.

About 100 feet east of south of the big pit is an open cut in which some slightly oxidized magnetite is exposed. This material is of the lodestone variety. That is, it is itself a magnet and will pick up small particles of iron or steel. Analysis proves it to be the highest grade iron ore found on the trip, since it contains 60.13 per cent iron, .36 per cent phosphorous, and no sulphur, arsenic, or titanium.

Numerous other openings exist on this property, and several others were visited, but they appeared so similar to those already described that they were not sampled. Enough time was spent in examining the deposits to prove their essential similarity to those in the Collier creek region, both the boulder and shear-zone types being represented. The principal points of difference are the relative scarcity of magnetite, and a substitution of chalcopyrite and pyrrhotite for chalcocite, cuprite, and native copper. It may be that the scarcity of magnetite is due to differences in climatic conditions, since the greater rainfall in the vicinity of the McKinley group may have hastened the decomposition of any magnetite that once existed there.

STEAM BEER MINE (placer) GREENBACK DISTRICT JOSEPHINE COUNTY

Diller reports that:

the Steam Beer placer, near Leland, owned by H. K. Miller, has continued in full operation for a number of years. The ditch is about 9 miles in length and supplies a head of 200 feet. The gravel terrace is 50 feet above Grave creek, which affords excellent dumping ground. The mine exposes 25 feet of gravel, generally coarse below, and made up largely of greenstone with scarcely any quartz. The bed rock is slate.

STEAMBOAT POCKET (gold) UPPER APPLEGATE DISTRICT JACKSON COUNTY

The Steamboat pocket, 2 miles west of Steamboat, was mined out before 1869; it is said to have produced \$350,000, which came from a shallow surface working in andesite. Scheerer has explored the andesite under the Steamboat pocket by several adits, two entering from the south and one from the north side of the hill. The upper adit is at an elevation of about 3000 feet in Sec. 20, T. 40 S., R. 4 W., entering N. 10° E. and opening into several crosscuts and drifts following small veins and fractures. A little stoping has been done chiefly on two veins. The country rock is andesite which is faulted in several directions like a system of joints on a large scale. One vein containing 18 inches of quartz strikes N. and dips 45° W. Another with 10 inches of quartz (on which the pocket was located) strikes N. 10° W. and dips 45° E. Another with 5 inches of quartz strikes N. 80° W. and dips 75° N. Another with the same thickness of quartz strikes N. 45° and dips

55° N. E. Still another with 3 inches of quartz strikes N. 55° E. and dips 75° N. W. The adit from the north extends S. 70° E. into the other workings. At the present face of the main adit there is a pyritized shear zone.

STEAR PROPERTY**AGNESS DISTRICT****CURRY COUNTY**

See "Stephens and Stear" property.

STEEN AND LINDGREEN CLAIMS (gold) CORNUCOPIA DIST. BAKER COUNTY

These claims are in Norway basin, which is some 3 miles from Cornucopia, on the headwaters of the west fork of Pine creek. A trail goes up on the more gentle slopes to the north of Simmons mountain and drops down some 300 to 400 feet into Norway basin.

The country rock is greenstone varying from dense to amygdaloidal and from fine-grained to porphyritic. It is made up of a series of flows similar in every way to those of Simmons mountain.

The situation of the outcrop of the vein is on the floor of the basin, but it is somewhat concealed because of loose rock and freshly made soil. The vein has a N. and S. strike and dips 65° to the E. It is developed by an adit upon the vein 750 feet long which reaches a maximum depth of 200 feet. The vein is of the shear zone type and varies in width from a streak of gouge up to 16 feet. Three ore shoots have been found; the first runs 100 feet in from the portal; the second begins 80 feet beyond the first and continues to the face; while they expect to be well into the third before the season closes. This third shoot is the main objective of the owners, because of the good values found at the surface.

In 1915 and 1916 drifting was continued which opened up good widths of medium and low grade ore, but owing to the death of Mr. Lindgreen the third or principal shoot was not developed.

STELLA COAL MINING COMPANY**WASHINGTON**

Office: 426 Lumber Exchange Bldg., Portland, Oregon. M. J. Lynch, 427 Lumber Exchange Bldg., Portland, Pres.; J. P. McNery, The Dalles, Oregon, Sec.; L. Shanhan, 144 Third St., Portland, Treas. Capital stock, \$25,000; par value \$10; capital stock all subscribed and paid up, none issued. (1916 report). Properties located near Stella, Washington.

STEPHENS AND STEAR PROPERTY (gold) AGNESS DISTRICT CURRY COUNTY

This property, which is owned by Mr. Stephens and Charles Stear, is situated about 3000 feet north of the Night Hawk about 4 miles southeast of Agness. It has been developed by means of a tunnel which is said to be over 300 feet long, but was locked at the time the examination was made. The dump is of such size as to indicate that considerable development work has been done. From material on the dump, it seems probable that the deposit consists of relatively narrow white quartz stringers through a sheared or brecciated zone, which is said to be more than 20 feet wide in some places. The country rock is mostly greenstone, but there is some serpentine on the dump, and it is evident that both rocks are penetrated by the workings. There is so much wash on the surface that the relationship of these could not be determined. Some calcite and a little pectolite and red hematite are present on the dump, but it is evident that these are not common. The quartz is said to occasionally show free gold, and it is also claimed that gold can be panned from it at many points. It is reported that this property was last worked in the spring of 1915.

STERLING GOLD QUARTZ MINING AND MILLING COMPANY**UPPER APPLAGATE DISTRICT****JACKSON COUNTY**

Office: Medford, Oregon. W. H. Canon, Pres.; J. L. Denner, Sec., and G. L. Davis, Treas., all of Medford, Oregon. Capital stock, \$1,000,000; par

value \$1.00; capital stock subscribed, \$702,995; amount issued, \$636,095; \$9114.50 paid up. (1912 report. Dissolved January 11, 1916).

The Sterling Gold Quartz Mining and Milling Company has developed a group of claims in Secs. 28, 29 and 32, T. 38 S., R. 2 W., at an elevation of about 2800 feet by barometer. The lower adit is about 240 feet long following a vertical quartz vein 1 foot or less in thickness associated with fissuring filled by calcite and sulphides. The middle adit is about 60 feet long following quartz stringers which strike S. 70° E. and dip about 50° N. E. The upper adit is about 400 feet long; it enters as a crosscut, and then drifts on crushed zones in the country rock, one of which strikes N. 15° W. and is nearly vertical. Seams of calcite, quartz, and some pyrite run in all directions. The main crushed zone strikes N. 45° W. and dips about 80° S. W. Some stoping has been done irregularly in this zone. No work has been done for the last few years.

STERLING MINE (placer) UPPER APPLEGATE DISTRICT JACKSON COUNTY

The Sterling placer mine is on Sterling creek, from 1 to 4 miles above its mouth, at Buncom, on Little Applegate river, and is owned by R. S. Bullis, of Medford. The present workings are on the south line of Sec. 33, T. 38 S., R. 2 W., at an elevation of about 2300 feet. A large electric power pump has recently been installed, by means of which pressure at the nozzle has been increased to the equivalent of a head of about 200 feet. The gravel is so thoroughly cemented that much of it must be broken with powder before using the giants. The deposit is 20 to 40 feet thick and about 400 feet wide. Drifts have been run on bedrock ahead of the giants about 100 feet. The gravel contains boulders of andesite and some quartz. According to G. F. Kay:

The values are found across a width of nearly 200 feet. In these gravels the tusks and jaws of a mammoth, as well as other mammalian bones, have been found. The bed rock at the mine is greenstone, in which are patches of slaty tuffs, whose strike is N. 8° E. and dip is about 60° W. The slope of the bed rock is about 2 feet in 100 feet. The length of the working season varies from 6 to 9 months. The value of the gravels was about 40 cents to the cubic yard. The total production of the mine is said to exceed \$3,000,000.

STERLING MINING COMPANY UPPER APPLEGATE DIST. JACKSON COUNTY

Dissolved by proclamation in January, 1917.

STEVENSON MINING COMPANY (gold)

GREENHORN DISTRICT

GRANT AND BAKER COUNTIES

Local name, Spero mine.

Office: Greenhorn, Oregon. Stephen Little, Pres.; Edward G. Stevenson, Sec. Capital stock, \$1,000,000; par value \$10; all subscribed, issued and paid up. (1915 report).

This company owns 7 claims a short distance east of Greenhorn at the old town of Robinsonville. The country rock is serpentine. The vein strikes N. 30° E. and is 10 to 15 feet wide, and comprised of massive white quartz. The property has only the assessment work done upon it each year.

STOCKTON MINE (gold)

SUSANVILLE DISTRICT

GRANT COUNTY

This property has had considerable prospecting done upon it, but in recent years has been idle. It has been in litigation with the Badger Gold Mining and Milling Company, which see.

STUB MINE

BAKER DISTRICT

BAKER COUNTY

For description see "Kent Mine."

STURGIS MINE (placer)

UPPER AGGLEGATE DISTRICT

JACKSON COUNTY

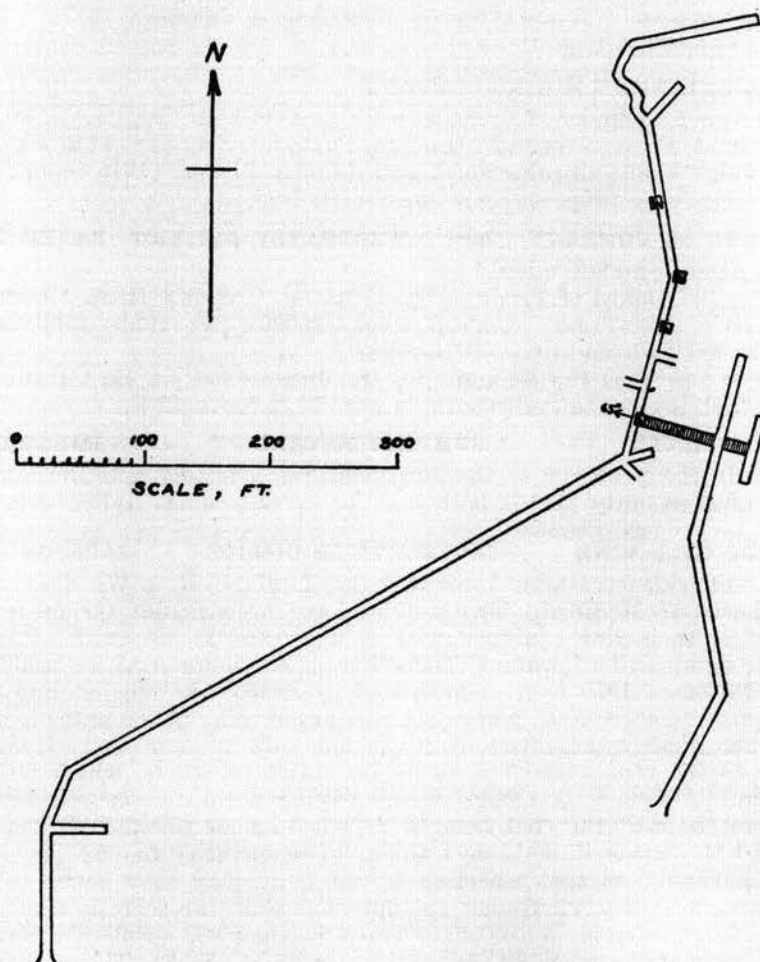
The Sturgis mine is 4 miles southwest from Jacksonville on Forest creek, in Sec. 10, T. 38 S., R. 3 W. It was formerly the property of the Sterling

Mining Company, but is now owned by Vance Mining Company, of Eureka, Cal., and leased by Lou Stone. The property contains about 900 acres.

The deposit has an average thickness of about 30 feet. In the lowest 10 feet are gravels and sand containing rounded and subangular boulders, which are chiefly of greenstone, although some are of granodiorite. The bedrock is greenstone much fractured and veined; in places it is very slaty, the strike being N. 30° E. and the dip 48° S. E. The mine is equipped with giants, and a derrick is used for handling the boulders. About 1 acre a year is mined.

SUGAR PINE MINE (gold)**GALICE DISTRICT****JOSEPHINE COUNTY**

The Sugar Pine mine was one of the earliest quartz mines discovered in the Galice district. It is said to have been opened by Cassidy and Draper in 1860 and worked by Green brothers from about 1875 to 1887, when it was sold to the Sugar Pine Mining and Milling Company. It is now owned by Mrs. Mollie Belding, of Grants Pass.

**SUGAR PINE MINE**

Main workings, Sugar Pine mine

It is on the north fork of Galice creek, about $2\frac{1}{2}$ miles southwest of Galice. It is opened by nearly 3000 feet of underground workings. At the lower adit at an elevation of about 1700 feet the vein seems to be a narrow dike intrusive in amphibole schist. This entry has a length of about 1100 feet, of which about half is following one or more veins. The main lode is 1 to 5 feet in width and contains many stringers and lenses of quartz; it strikes about north and dips 65 to 70° W. The workings are shown as platted from a rapid Brunton compass survey in the illustration. In one place on the upper adit level, 150 feet above the lower, the lode is widened to about 5 feet and crossed diagonally by quartz veins. The ore consists of quartz, often adhering solidly to greenstone, and carrying a little pyrite, chalcopyrite and galena. The ore from a rich shoot mined out by the Green brothers is said to have yielded more than \$25,000 when treated in an arrastre. A 10-stamp mill, erected in 1908, was run a few months and later moved to the Oriole mine.

SUGAR PINE MINING AND MILLING COMPANY GALICE DIST. JOSEPHINE CO.

Articles of incorporation filed in 1914. No report made to State Corporation Commissioner. Dissolved by proclamation in January, 1917.

See "Sugar Pine Mine."

SULLIVAN EXTENSION MINING COMPANY

IDAHO

Office: 501 Chamber of Commerce Bldg., Portland, Oregon. J. W. P. McFall, Portland, Pres.; George F. Holman, Portland, Sec. Capital stock, \$1,000,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company's properties are located in Idaho.

SUMMIT MINING COMPANY (placer) WEATHERBY DISTRICT BAKER COUNTY

Local name, Summit mine.

Office: 317 Board of Trade Bldg., Portland, Oregon. H. A. Moore, Pres.; Laura Moore, Sec.-Treas. Capital stock, \$9000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company has the Summit placer mine, located in Lost Basin, Baker county, which is close to Pedro mountain in T. 12 S., R. 42 E.

SUMPTER SMELTER

SUMPTER DISTRICT

BAKER COUNTY

Formerly the property of the Northwestern Smelting and Refining Company, but has recently (1916) been sold for taxes to J. A. Gyllenberg. It has been idle for several years.

SUNNYSIDE COAL MINE

JACKSONVILLE DISTRICT

JACKSON COUNTY

The Sunnyside coal mine is in Sec. 36, T. 37 S., R. 1 W., about 5 miles east-southeast of Medford. Two entries have been made; the entry to the northwest is an incline equipped with a boiler and steam hoist. It was not inspected, being full of water. The other is horizontal and accessible; it is at an elevation of 1970 feet, as measured by aneroid barometer, and extends S. 34° E. about 650 feet. In places the roof has caved, but the entry is nowhere caved shut. Nearly the entire length of this adit the coal bed extends from the floor to the roof without showing its entire thickness, which was found to be about 12 feet at one point where caving permitted measurement. At the face of the adit the coal seam is 8 feet 3 inches thick, and in a branch passage to the south it is 15 feet thick. The quantity of coal in the seam varies remarkably, so that a section at one point may show much more coal than at another. The maximum amount of coal in the seam is about 75 per cent and the minimum in the main entry is about 30 to 40 per cent. The coal bed has a strike of N. 72° W. and a dip of 13° N. E. The coal is brittle and slacks to small fragments upon exposure to the weather.

About 130 feet from the face of the adit, branch tunnels leave the main entry on both sides. Those extending to the northeast follow down the dip of

the coal and are therefore full of water and inaccessible. On the other side one branch extends S. 84° W. about 500 feet; from this laterals extend northward to a parallel tunnel and other workings, whose extent was not determined. Following the main branch to the west, the coal seams in the coal-bearing bed become thinner and the shale bands thicker until at the face the bed contains only a little pure coal.

There are several faults disclosed in these workings, but they are not important, as the displacement is only 1 to 4 feet.

J. S. Diller, of the U. S. Geological Survey, described explorations for coal, probably at this mine, in 1909, as follows:

The coal 6 miles east of Medford lies along the steeper slope, which rises from the edge of the valley, 600 feet above the town, to the bold front of the Cascade range. Some years ago the Southern Pacific Company prospected a coal bed at this point, and the size of the dump indicates that the trial drifts must have been about 100 feet in length. Since then R. P. Little has discovered a number of other coal beds a short distance farther up on the same hillside and opened two of them by slopes, tunnels, and drifts, aggregating nearly 900 feet in length. Drainage is effected by a lateral tunnel into an adjacent ravine. Considerable coal has been hauled to Medford and sold at \$8 per ton.

The principal bed prospected is about 12 feet thick, and the striking feature at the entrance of the gentle slope is the large number of clay and sand partings with very little coal between them. The partings weathering whitish are strongly contrasted with the darker bands. As the slope is descended along the bed there appears a decided increase in the quantity and improvement in the quality of the coal toward the northeast. The bands of black lustrous coal, generally not over 6 to 8 inches thick, locally swell to more than a foot and furnish the source of supply for the local demand. The intermediate shaly coal and coaly shale is abundant and requires much picking to obtain satisfactory results. Several faults striking N. 40° E. and dipping 26° to 42° S. E. have been encountered in the tunnels. The direction of movement and the amount of displacement could not be definitely determined. No lavas were seen in the mine, but they appear higher up, covering the whole succession of coal beds. The decided improvement in the coal down the dip suggested that as the most favorable direction in which to prospect.

Since the examination on which the foregoing statement is based was made, the Pacific Coal Company has purchased this mine and has developed the openings to the northeast along the dip of the coal bed for more than 1000 feet. The prediction that the coal would be found of better quality and in larger quantity has been confirmed. A few small faults have been encountered, but these are all of the normal type and easily overcome. The mine is now (1907) producing coal and supplies the local market. The development of this mine has greatly stimulated prospecting in other parts of the field.

J. A. Holmes of the Geological Survey collected a sample of coal at this locality last summer (1907) and has kindly furnished the following results of an analysis in the laboratory of the Survey fuel-testing plant.

Analysis of Coal Obtained Near Medford, Oregon.
(F. M. Stanton, chemist in charge)

	As received	Air dried
Laboratory No.....	5346	5346
Loss of moisture on air drying .....	.....	2.00
Moisture	11.30	9.49
Volatile matter	23.39	23.87
Fixed carbon	31.89	32.54
Ash	33.42	34.10
Sulphur	1.16	1.18
Calories	4,183	4,268
British thermal units.....	7,529	7,683

The sample taken is a complete section of the coal bed exposed and represents what has to be removed in working the coal. It contains not only the good coal but all the shaly partings. The high percentage of ash indicates that the bed contains much that would have to be thrown away in mining. The ash is about four times as great as that of the bed mined at Libby in the Coos Bay region.

SUNNYSIDE MINING AND MILLING COMPANY (gold-copper)

NORTH SANTIAM DISTRICT

MARION COUNTY

Office: 569 Spokane Ave., Portland, Oregon. A. B. Crossman, Pres., Lewis Bldg., Portland; Walter Adams, Sec.-Treas., 569 Spokane Ave., Portland. Capital stock, \$1,000,000; par value \$1.00; \$580,000 subscribed, issued and paid up. (1915 report).

Property is located 16 miles northeast of Gates, by good wagon road 13 miles, and trail 3 miles. There are 9 claims.

This property joins the Gold Creek Mining and Milling Company's grounds and development work so far completed indicates similar vein and mineral conditions as found at that property. Only one opening was visited, which is a drift upon a vein where massive zinc, iron, lead and copper sulphides a foot or two wide were seen at the face.

Assessment work is done each year.

SURPRISE MINING COMPANY (placer) WALDO DISTRICT JOSEPHINE COUNTY

Office: 619 Henry Bldg., Portland, Oregon. H. Taylor Hill, Pres.; T. I. Loughlin, Sec.; M. E. Freeman, Treas., all of Portland. Capital stock, \$18,000; par value \$1.00; all subscribed and issued and paid up. (1916 report).

This company owns 7 placer claims or approximately 140 acres on the east fork of Althouse creek, 5 miles east of Takilma. In the fall of 1916 operations were in progress putting the mine in shape for winter operations. It is understood that some concentrating machinery for saving the fine gold is being installed.

SUSAN D MINE (gold)

VIRTUE DISTRICT

BAKER COUNTY

Formerly the White Swan mine, William Schlutting, principal owner, located about 3 miles southeast of the Virtue, in Sec. 25, T. 9 S., R. 41 E., and has been practically idle since 1903. The mine was worked successfully in the '80s and was idle from 1897 to about 1900, when it came into the possession of Letson Balliet, who operated this and other properties with a brass band and other similar features until 1903, when the Federal Government stopped his operations. Previous to his time the production was estimated to have been not less than \$200,000.

The country rock here, in contrast to the diorite at the Flagstaff and the greenstone at the Virtue, is a black soft argillite with a few well defined diorite dikes which are off-shoots from the intrusion below. The vein strikes northwesterly and is nearly vertical. The quartz is white and massive like that of the Virtue, with a small amount of sulphides and calcite. It is developed by a shaft about 300 feet deep and several drifts upon the vein. There are many small veins in the vicinity of the Susan D, and in some of these chimneys of coarse gold have been found, although none of large amounts.

SUSANVILLE PLACERS

SUSANVILLE DISTRICT

GRANT COUNTY

The placer mines near Susanville were discovered in 1864 and have been worked practically every season since then. Those of Elk creek have been worked over more than once and the last time by Chinese who ceased operations in 1915. The territory of chief interest is in the valley of Middle Fork of the John Day river from the mouth of Elk creek down stream for 4 or 5 miles. This has been held under option for some time by Emil Melzer and associates of Baker, Oregon, who, in 1914 and following, sank pits and did some churn drilling. The valley here is quite broad varying from several hundred feet up to a half mile or more and the possible dredging ground involves several hundred acres. Values are reported to be in sufficient amount to make dredging profitable.

SUTHERLIN QUICKSILVER MINING, REFINING AND DEVELOPMENT COMPANY (mercury) DOUGLAS COUNTY

Local name, Bonanza mine.

This company was incorporated September, 1916, with a capital stock of \$6000. Incorporators are L. S. Griswold, W. T. S. Hoyt and John E. Meister.

The company's property was formerly called the Bonanza mine and is located 8 miles east of Sutherlin in Douglas county on Foster creek. It is under the management of L. S. Griswold.

The ore deposit is a low grade cinnabar ore disseminating through brecciated or shear zones in andesite.

The company is installing a small mill and retort and it is proposed to concentrate the ores before retorting.

SWACKER FLAT MINE (placer) GOLD HILL DISTRICT JACKSON COUNTY

At the Swacker Flat placer mine, 8 miles southwest of Gold Hill on the left fork of Foots creek in the N. E. $\frac{1}{4}$ Sec. 12, T. 37 S., R. 4 W., there is a fault which is later than the formation of the placer gravel. The fault strikes N 40° W. and dips about 65° N. E. The vertical displacement is at least 10 feet. The region is being carefully tested for placer gold in the gravels.

**SWASTIKA MINING COMPANY (placer) (Maine corporation)
GRANTS PASS DISTRICT JOSEPHINE COUNTY**

Local name, Swastika mine.

Office: 19 Congress St., Boston, Mass. Bernard C. Pratt, 53 State St., Boston, Mass., Pres.; Fred C. Cox, Malden, Mass., Sec.-Treas.; E. A. Rathbone, Grants Pass Ore., attorney in fact. Capital stock, \$200,000; par value \$1.00; all subscribed, issued and paid up. (1914 report. Out of business).

This company has been exploiting a low gravel bank in the forks where Jack creek flows into Jump-off-Joe, 4 miles east of Hugo, known as the Swastika placer mine. It was operated for several years before 1910; since then very little has been done, aside from work on a small scale by lessees. During the operation of the mine by the company two 18-inch pipes were used, one under a head of 150 feet and the other of about 75 feet. According to Diller:

The gravel is 15 to 30 feet deep and is composed of greenstone pebbles. It is coarsest below, the largest boulders being 2 feet in diameter. In many places the whole mass is rotten, so that many of the boulders go to pieces under the stream from the giant. The bed-rock in the Swastika mine and throughout the slopes of Jack creek is greenstone.

This mine at present is under lease to Messrs. Mackey and Ward, of Hugo, Oregon.

SYKES CREEK MINING COMPANY (placer) JACKSONVILLE DIST. JACKSON CO.

Office: Seattle, Washington. I. J. Merrill, Pres., 1019 Post St., Seattle. The secretary and treasurer of this company traded their interests and no new ones had been elected at the time this report was made. Capital stock, \$30,000; par value \$1.00; \$18,325 subscribed, issued and paid up. (1915 report).

This company owns 80 acres of placer ground 10 miles up Evans creek from Rogue river in Sec. 1, T. 35 S., R. 4 W. There is no activity at the property.

SYLVANITE (gold-silver-tungsten) GOLD HILL DISTRICT JACKSON COUNTY

The Sylvanite mine is in Sec. 2, T. 36 S., R. 3 W., about 3 miles northeast of Gold Hill. It is owned by E. T. Simons. The vein strikes N. 22° E. and dips about 65° E. and the country rocks have the same attitude; they are argillite partly altered to chlorite and serpentine. The vein contains quartz carrying some pyrite. The workings, now badly caved, are reported to consist of a drift 1200 feet long at an elevation of 1360 feet by barometer and a crosscut to the vein at an elevation of 1650 feet, with a shaft to the lower level. According to W. A. Marvin, who was in charge of the mine at one time, the ore contained no telluride, but a little galena and much pyrite in quartz; the fault gouge contained about \$3 worth of gold and silver per ton; high grade gold occurred in "boulders" not in place at depths from 80 to 160 feet; sulphide ore began to appear at about 160 feet depth and was 5 feet wide at 225 feet depth; the hanging wall was a slate and the footwall a limestone.

Considerable interest has been attached to this property since the discovery in March, 1916, of tungsten along with the gold ores in the form of

scheelite. The mineral occurs in small stringers with quartz. Samples have been taken from these quartz ledges which run as high as 40 per cent tungstic acid, but it is claimed by the management that the vein as a whole runs less than 2 per cent. The veins carrying the best grade of tungsten have been developed to a small extent and the tungsten resources of the mine have not yet been determined.

The property is under lease and bond to Stone and Avena, of Denver, Colorado, who are doing some further development work.

TABER FRACTION (gold) CRACKER CREEK DISTRICT BAKER COUNTY

The Taber Fraction, 346 feet long, is on the North Pole-Columbia lode between the Columbia Gold Mining Company's ground and that of the Bourne Gold Mining Company. For a general description of the lode see Columbia Gold Mining Company on another page. Total production estimated at \$475,000. No production since 1905, when the Columbia Gold Mines Company ceased to operate it under a lease.

A lease and bond upon this property was given to James A. Howard, of the Oregon-Idaho Investment Company, of Baker, Oregon, in the fall of 1916 and permission was secured from the E. and E. mine (Bourne Gold Mining Company) to use tunnels of the latter in working the property.

TAKILMA SMELTING COMPANY (Colorado corporation) WALDO DISTRICT JOSEPHINE COUNTY

Office: 301 Mining Exchange Bldg., Colorado Springs, Colorado. Charles L. Tutt, Pres.; William Tutt, Sec.; J. A. Hull, Treas., all of Colorado Springs; C. E. Tucker, Takilma, Oregon, attorney in fact. (1916 report).

TALENT COAL COMPANY ASHLAND DISTRICT JACKSON COUNTY

Office: Talent, Oregon. Emmett Beeson, Pres.; E. B. Adamson, Sec.; Louis Brown, Treas., all of Talent. Capital stock, \$10,000; par value \$10; \$5040 subscribed, issued and paid up. (1916 report).

The company owns 320 acres in Sec. 16, T. 38 S., R. 1 E. A coal seam has been opened by Emmett Beeson, of Talent, by means of a slope or incline shaft following the coal nearly on its dip. This coal outcrops in a ravine at the foot of a sandstone cliff at an elevation of about 2600 feet. Fossil impressions of leaves were collected from shaly sandstone at an elevation of about 3050 feet near the top of the cliff a little south of east of the coal seam. The sandstone strikes about S. 45° E. and dips about 25° N. E. at the place where the fossils are found. The coal seam has a strike of N. 53° W. and a dip of about 16° N. E. The slope opening this coal discloses a fault at 70 feet from the portal which strikes N. 10° W. and dips about 62° E. The hanging wall of the fault is displaced vertically downward about 6 feet. At about 120 feet from the portal the coal seam is narrowed to about 3 inches by the doming up of the floor; at the breast, about 130 feet from the portal, the coal is again nearly 2 feet thick.

The section at this outcrop follows:

Section at Beeson's Slope in Sec. 16, T. 38 S., R. 1 E.

	Feet	Inches
Feldspathic sandstone	10	
Shaly sandstone with fossil leaves.....		6-8
Feldspathic conglomeratic sandstone....	400	
Covered	5	
Feldspathic conglomeratic sandstone....	6	
Fine grained sandstone.....		2-4
Coal	1	1
Coal and coaly shale.....	1	3
Fine grained sandstone.....	8	
Feldspathic conglomeratic sandstone....	42	
Coarse quartzose conglomerate	10	
Feldspathic conglomeratic sandstone....	20	

TEMPEST MINE (gold-silver) GREENSHORN DISTRICT GRANT COUNTY

This 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 sericitic 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.

TEN SPOT CLAIM GRANTS PASS DISTRICT JOSEPHINE COUNTY

The Ten Spot claim, 5 miles southeast of Grants Pass, is near the north side of Sec. 27, T. 36 S., R. 5 W., on Baldy mountain. It is owned by G. E. Everson and R. E. McDaniels, of Creswell, Oregon. The country rock is decomposed or "rotten" tonalite, locally called granite. The vein is not now exposed, but is said to be a small quartz vein which has been prospected by surface pits and a shaft 30 feet deep all in "rotten granite." The vein seems to strike N. 58° E. A crosscut adit is being driven by contract; it extends 140 feet S. 40° E. in "rotten granite," so soft as to be dug with pick and shovel and to require careful lagging to hold the ground. The vein has not yet been reached by the crosscut.

TEPUSTETE IRON COMPANY MEXICO

Office: 1215 Wilcox Bldg., Portland, Oregon. Theo B. Wilcox, Pres.; J. Frank Watson, Sec., both of Portland, Oregon. Capital stock, \$100,000; par value \$100; all subscribed, issued and paid up. (1916 report).

This company's properties are located in San Ysidrio, Lower California, Mexico.

TEXAS OREGON POWER AND PLACER MINING COMPANY GALICE DISTRICT JOSEPHINE COUNTY

Office: Merlin, Oregon. John M. Fenn, Pres.; John McM. Byers, Sec., both of Merlin. Capital stock, \$130,000; par value \$1.00; \$129,900 subscribed, issued and paid up. (1915 report).

This company has 204.3 acres of placer ground 10 miles northwest of Merlin at the mouth of Taylor creek, near Galice.

THOMAS CLAIMS WALDO DISTRICT JOSEPHINE COUNTY

See "Tomlinson, Gates and Thomas" claims.

THOMAS COPPER CLAIM EAGLE CREEK DISTRICT BAKER COUNTY

See "Forster & Thomas" copper claims.

THOMPSON MINE (copper) COOS COUNTY

Diller says:

Mention should be made of the copper ore that has been found in a mineralized belt nearly 25 miles to the northeast in the vicinity of Mount Bolivar, the most prominent peak in the greenstone belt that is shown near the northwest corner of the map. The greenstone of this belt is impregnated at a number of places by pyrite, chalcopyrite, and bornite, and contains numerous veins of quartz and calcite. The most important copper prospect noted in this region is on the west fork of Cow creek at the locality known as the Thompson mine. It has been exploited by several tunnels and inclines and yielded at least 50 tons of ore, chiefly chalcopyrite, and bornite. The works were closed at the time of my examination, but the occurrence of so much ore on the dumps apparently shows the existence of ore bodies of considerable size. This prospect, although only 17 miles from the main line

of the Southern Pacific railroad at West Fork and all down grade, is reached by trail only. Numerous prospects have been opened in this mineralized belt between Mount Bolivar and Rogue river, but none of greater promise than that already noted has yet been found.

THREE LODS MINING COMPANY GALICE DIST. JOSEPHINE COUNTY

Office: Medford, Oregon. C. E. Wickstrum, Rogue River, Oregon, Pres.; N. L. Townsend, Medford, Sec.; George Lindley, Medford, Treas. Capital stock, \$350,000; par value 35 cents; all subscribed, issued and paid up. (1916 report).

This company owns the Three Lodes group of 9 claims and has bonded the Golden Pheasant group of 9 claims. These claims are located about 2 miles west of Galice on a contact between greenstone and serpentine.

This property has been exploited at various times during the past several years as a tin, tungsten and platinum property. Lately it is supposed to be a molybdenum property.

TIN PAN MINE (gold) GOLD HILL DISTRICT JACKSON COUNTY

The Tin Pan mine, 5 miles southwest of Gold Hill, is in the S. W. $\frac{1}{4}$ sec. 31, T. 36 S., R. 3 W. on the ridge between Galls and Foots creeks. It was located many years ago; in 1908 it was owned by the Pacific American Gold Mining Company and prospected by more than 1200 feet of drifts, shafts, and other workings on the vein without finding any large body of good ore. At that time the mine was equipped with a 10-stamp mill (since removed) having a Blake crusher and two concentrating tables. The country rock on top of the ridge west of the mine is an andesite porphyry containing abundant much altered phenocrysts of plagioclase, and bunches of green hornblende or brown biotite as well as some magnetite, epidote and siderite in a fine granular groundmass. In 1913 the workings were badly caved and inspection was impossible. It was relocated in July, 1913, by M. L. Hall. According to G. F. Kay:

The country rock in which the ores occur are slates, limestones, and greenstones, the greenstones apparently being intrusive in the sedimentary rocks although some of them may be volcanic. The sedimentary rocks strike about N. 13° E. The strike of the vein is between northeast and east and the dip is nearly vertical. The vein varies in width from less than 18 inches to more than 6 feet of solid quartz between definite walls, which are in general but slightly altered. In places there is a gouge from 1 to 3 inches in width. This material is clay-like, but it contains carbonates and sulphides. Most of the gold content of the vein is in the sulphides, which run about \$60 to the ton. The sulphides are pyrite and galena which together constitute less than 2 per cent of the ores. Some faulting has occurred. The zone of oxidation reaches a depth of more than 100 feet.

TOMLINSON, GATES AND THOMAS CLAIMS (copper) WALDO DISTRICT JOSEPHINE COUNTY

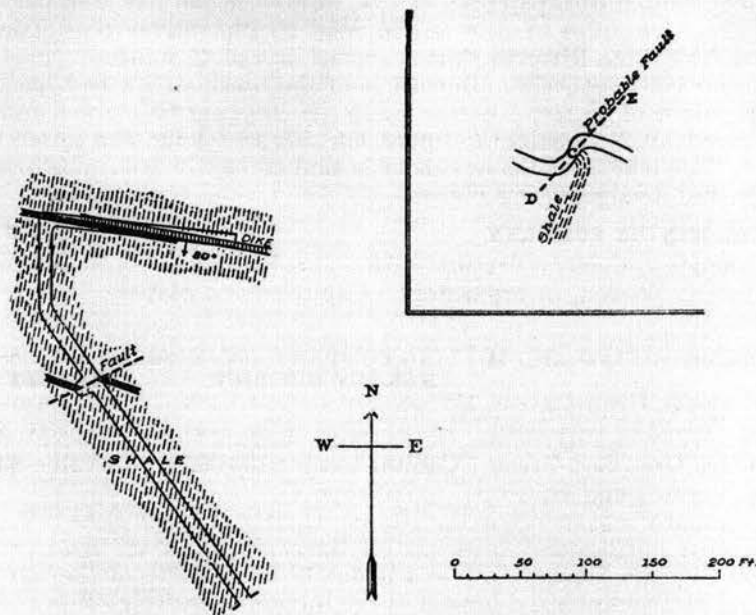
The copper prospect belonging to Tomlinson, Gates and Thomas, 12 miles southeast of Holland, is on top of the ridge east of Grizzly gulch, at an elevation of about 4850 feet as measured by barometer.

At the upper shaft the vein strikes N. 60° W. and dips about 75° S. W. It is about 18 inches wide, but the adjoining ground contains quartz and some copper minerals to a width of about 4 feet. The copper occurs in chalcopyrite, bornite, chalcocite, chrysocolla, and malachite. Pyrite is also abundant.

TOWN MINE (gold) JACKSONVILLE DISTRICT JACKSON COUNTY

The Town mine near Jacksonville, is on a ridge about 800 feet west of the reservoir on Jackson creek at an elevation of 2200 feet as determined by aneroid barometer. It is owned by J. G. Rinehart. A bunch of rich gold ore known as the Johnson pocket and reported to have yielded \$30,000, was taken from a shallow cut in a quartz vein in micaceous shales near the top of the ridge. The old partly filled opening marking the site of the pocket is curved like a circumflex as shown in the drawing. At the point C the shaly layers are curved, probably as a result of faulting in a direction DE, which seems

to have offset the vein about 16 feet. A crosscut adit was driven from a point about 300 feet down the hillside to the southeast to cut the veins under the pocket. It was run N. 35° 265 feet, and then north 70 feet and easterly about



Town mine, main adit and surface workings

150 feet as shown in the drawing. At 200 feet from the portal a mass of quartz was cut in the northeast wall, but as it did not continue across the adit it was not recognized as the vein, and the adit was continued. More recent work at this point discloses a narrow band of quartz in an apparent fault leading southerly to more quartz which is probably the faulted continuation of the main vein, the offset being similar to that observed on the surface. The vein strikes north of west and has a nearly vertical dip. The extension of the adit opened a second nearly parallel vein which pinched out to the east, the tunnel then following a dike along the south side of which the vein was formed. The country rock is a shaly argillite which strikes N. 10° E. and dips 80° E. A dike present in the adit consists largely of hornblende and is a mafic diorite or a spessartite.

About 600 feet to the north on the northeast slope of the ridge at about the same elevation another adit runs S. 15° W. nearly 200 feet. At 185 feet from the portal it cuts a 2-foot vein of quartz which strikes S. 85° W. and dips steeply to the north. A drift of 20 feet to the west on the vein shows no important change in character. This is apparently below a shallow pit on the surface, about 120 feet higher, made in taking out the "Bowden" pocket which is reported to have yielded \$60,000.

Beside the reservoir on Jackson creek another vein called the Reservoir ledge has been worked. The vein in this ledge is 1 to 3 feet wide and strikes N. 85° W. with a dip of about 85° N. It is opened only on the surface.

There has been no activity at this mine for several years.

TRAVERSO CLAIM **UPPER APPLEGATE DISTRICT** **JACKSON COUNTY**
See "Haskins and Traverso" claim.

TREASURY GROUP (gold, etc.) **GALICE DISTRICT** **JOSEPHINE COUNTY**
The Treasury group, about 4½ miles northwest of Galice, is noteworthy

because its ore contains not only quartz and pyrite, but also chalcopyrite, malachite, and sphalerite.

TREASURE MINE (gold)**BLUE RIVER DISTRICT****LINN COUNTY**

Property consist of 5 patented claims, located in the southern part of T. 15 S., R. 4 E. Five miles of fair wagon road to Blue River post-office, and a good road from Blue River to Eugene, a distance of 45 miles.

Country rock is andesite. Deposit is of the brecciated zone type, having a maximum width of 45 feet. Strike N. 45° W. dipping 80° to the southwest.

Developed by 2 tunnels, the upper one 500 feet long, the lower one 1800 feet long. The length of the ore shoot is said to be 270 feet. Mill consists of 12 stamps and amalgamating plates.

TRI METAL MINING COMPANY**JOSEPHINE COUNTY**

Filed articles of incorporation 1916. Joe R. Smith, C. McDougal, James White and M. Norden, incorporators. Capital stock \$10,000. Office: Grants Pass, Ore.

TROUT CREEK MINING AND MILLING COMPANY (gold-silver-lead and zinc)**HARNEY DISTRICT****HARNEY COUNTY**

Local name: "Bullion Quartz Mine."

Office: Canyon City, Ore. O. J. Darst, Burns, Ore., Pres.; F. S. Slater, Prairie City, Ore., Sec.-Treas. Capital stock \$100,000; par value \$1.00; all subscribed, issued and paid up. (1916 report).

This company's property is the Bullion Quartz claim in Sec. 4, T. 21 S., R. 32 E., 13 miles north and 8 miles east of Burns, on the stage road from Burns to Canyon City via Harney City and about 12 miles north of the latter on the headwaters of Trout creek, a branch of the Silvies river, which flows southward emptying into Malheur lake. The country rock is reported to be granite cut by large porphyry dikes. This property has not been visited but according to reports much work is done every year. In 1914, 100 feet of tunnel and 40 feet of a two compartment shaft, besides the construction of buildings was accomplished.

It is reported that the vein has been opened up at three places and that it is a strong ledge as much as 14 feet wide with assay values from \$4.00 to \$500 per ton. The railroad having been completed to Crane, Ore., 22 miles from the mine, the company will take out ore during the winter of 1916 for shipment to Salt Lake smelters.

TRUST BUSTER MINE (gold)**GOLD HILL DISTRICT****JACKSON COUNTY**

The Trust Buster mine 5 miles northeast of Gold Hill is a few hundred feet south of the N. W. corner of Sec. 36, T. 35 S., R. 3 W. at an elevation of 1700 feet by barometer. It is equipped with a Beers mill having a crusher, a plate, a concentrating table, and a 15 H. P. gas engine. An adit shows several quartz veins in tonalite; the junction of two veins gives a small shoot of ore which has been mined out to the surface, and about 20 feet below the adit level. The workings are too shallow to show sulphide ore. The main vein strikes N. 50° W. and dips 46° S. W. The mine was leased by the Pacific Coast Mining Company about 4 years ago.

TYEE BAR PLACER MINE**GALICE DISTRICT****JOSEPHINE COUNTY**

The Tyee Bar placer mine is on the south bank of Rogue river about a mile below Whiskey creek. It was worked years ago and reopened in 1911. The bedrock is argillite.

UMPQUA COPPER COMPANY (copper)**DOUGLAS COUNTY**

Local name, Rowley Group.

Office: Grants Pass, Oregon. J. F. Reddy, Pres., Grants Pass, Oregon;

Alva H. Gunnell, Sec.-Treas., Grants Pass, Oregon. Amount of capital stock, \$375,000; par value, 25 cents; \$362,884.50 issued. (1916 report.)

Property consists of 14 claims known as the "Rowley Group" in Sec. 4, T. 32 S., R. 2 W. 20 miles northwest of train in southern Douglas county and 30 miles in an air line north of Medford.

The ore bodies are found in a zone where shearing and compression has produced schist many hundreds of feet wide. Small sulphide lens-shaped masses of chalcopyrite and pyrite are found rather widely but irregularly distributed throughout the schist. These occurrences of sulphide which range in size from wheat grains to lenses an inch or more in thickness, together with a small amount of quartz associated with them are squeezed and drawn out in the planes or laminations of the schist, showing that they were formed either previous to, or during the movement which produced the schist. In the better looking areas which are 100 feet or more wide, they are found a few inches to a foot apart, with nearly barren material between. Under these conditions the principal problem in the development of the property will be to determine the volume of this schist which is sufficiently mineralized to make low grade copper ore bodies.

It seems probable that the property could be prospected to advantage by sinking a large number of drill holes over the more promising areas.

Considerable development work by tunnels and open cuts has been done. In some of these cuts and tunnels which are usually driven nearly at right angles to the general strike of the schist, samples have been taken which give some promise of rather large low grade copper deposits.

Near the footwall side of this wide schist zone is found a massive sulphide vein which is traced by iron stained capping for several hundred feet, and opened by 2 short tunnels near the bed of the creek. This vein is parallel to the schist and consists of nearly pure pyrite as much as 15 feet wide which is said to carry sufficient values in copper and gold to make it a low grade ore.

UMPQUA ZINC MINING COMPANY

DOUGLAS COUNTY

Office: 511 Corbett Bldg., Portland, Oregon. Jennie B. VanHorn, Pres.; J. T. VanHorn, Sec.-Treas. Capital stock, \$10,000; par value, \$1.00; all subscribed and issued; \$8000 paid up. (1916 report.)

This company has 2 quartz claims in Douglas county.

UNDERWOOD PLACERS

CORNUCOPIA DISTRICT

BAKER COUNTY

Placer deposits in the Cornucopia region are of rather limited extent, although further investigations may reveal new workable ground. The only placers now being worked are situated about two miles below the town of Cornucopia, on Pine creek, near the mouth of Boulder creek. They are known as the "Underwood" placers, and are now operated under the name of the Boulder Creek Mining Company, Charles Campbell, superintendent. It is a bench boulder gravel deposit with the bed-rock several feet above the present stream, and the "pay" in an old channel of Pine creek. The gold, which is usually quite coarse, is nearly all found close to bed-rock, or within a few feet of it. The bed-rock is covered by a deep overburden, composed largely of heavy boulders, some up to 6 or 7 tons. Previous to the sale to the present owners this property was worked by drifting, and the returns are said to have been about \$25 a day per man after the "pay" channel was struck.

The new owners have equipped the property with flumes, pipe, giants and derricks operated by water power, and have proceeded to hydraulic the ground. It would seem to a casual observer that the place where they began to hydraulic the ground was ill-advised. Apparently it should have been begun farther down the stream so that boulders and wash could have been placed on worked ground rather than to have begun apparently in the

middle of the deposit. It would seem that there would be a greater profit to continue with the working of the mine by means of drifting, because of the coarse deep overburden of low value.

The quantity of overburden and the great number of very large boulders together with equipment insufficient to handle them caused a shut down of the property in 1914. The property was not operated in 1915 and 1916.

UNION LEADER MINING COMPANY

DOUGLAS COUNTY

Office: Glendale, Oregon. F. G. Bowersox, Salem, Pres.; B. L. Darby, Glendale, Sec.; W. H. Darby, Salem, Treas. Capital stock, \$150,000; par value, \$25.00; \$76,500 subscribed, issued and paid up. (1916 report.)

This company owns 97.74 acres of mining lands with improvements 12 miles east of Glendale at the head of Cow creek in the S. E. $\frac{1}{4}$ Sec 36, T. 32 S., R. 5 W.

UNITED COPPER COMPANY (copper) (Washington corporation)

GREENBACK DISTRICT

JACKSON COUNTY

Local name, Copper King mine.

Office: 95 Union St., Seattle, Wash. S. S. Fluhart, 2600 First St., Seattle, Pres.; B. E. Fluhart, Leland, Oregon, Sec. and Attorney-in-Fact; Dr. R. N. Leezer, 95 Union St., Seattle, Treas. Capital stock, \$1,000,000.

The property of this company, the Copper King mine, is located at the head of the Slate creek branch of Grave creek about 18 miles east of Leland.

The ore deposit is a well defined fissure vein in andesite. The development in September, 1916, had exposed by surface cuts a well defined quartz vein with chalcopyrite which is said by the manager to run between 4 and 5 per cent copper and two dollars in gold. This company is erecting a mill on the property with which they will concentrate these sulphides to smaller bulk and haul to the railroad at Leland.

UNITED COPPER-GOLD MINES COMPANY (copper-gold-silver)

ILLINOIS RIVER DISTRICT

JOSEPHINE COUNTY

Office: Room 4 Murphy Block, Salem, Oregon. W. S. Low, Pres.; Daniel Webster, Sec.; C. E. Lebold, Treas., all of Salem, Oregon. Capital stock, \$500,000; par value, \$1.00; \$219,654 subscribed, issued and paid up. (1916 report.)

This company owned property on Pickett creek near Merlin which has been sold. It now owns 12 claims in Illinois district about 12 miles northwest of Selma, on Fall creek, one-half mile above its junction with the Illinois, at an elevation of about 1400 feet.

The copper ore of this locality has attracted attention many years. Early in the sixties of the last century a small smelting furnace was located at the mouth of Rancherie creek. The matte was packed out about 30 miles across the mountains to the coast. Another small furnace was built on Fall creek in 1894, but was not a commercial success, owing to the difficulties of transportation. In 1899, several hundred tons of ore was packed out to Selma, hauled to Grants Pass and shipped to Tacoma, where it is said to have been smelted at a profit. The mine has now been idle for several years.

The geology is described by Diller as follows:

The country rocks of the deposit are greenstone and serpentine. The greenstone is an ancient volcanic mass, a mixture of lava flows and tuffs of Mesozoic age that are greatly altered. Its fragmental character, though not a prominent feature, may be clearly seen on close examination of the clean exposure near the mouth of Fall creek, where the rock is made up of many lapilli. The serpentine is an altered saxonite, evidently of later eruption than the greenstone with which it is in contact.

The ore minerals are chalcopyrite and pyrrhotite, generally more or less intermingled, and either may be most abundant. Malachite is rare. In some places the pyrrhotite appears as small streaks in the chalcopyrite. The ore bodies removed were in the serpentine near its contact with the greenstone. It is possible that some ore occurred in the greenstone, but

the greater portion, if not all of it, appears to belong to the serpentine. The ore bodies were comparatively small and were in irregular bunches, not in distinct veins. The pyrrhotite was tested for nickel by R. C. Wells in the chemical laboratory of the Geological Survey. A mere trace of nickel was found, possibly 0.001 per cent.

The following statement is made by the management: There is 1000 feet of development work, including a 500-foot tunnel, and a 200-foot crosscut, exposing 1000 tons of ore. A dark gossan sometimes stained with copper is underlain at 15 feet in depth by ore carrying 18 per cent copper and 5 to 10 ounces silver and upwards of \$1 in gold.

UNITED GOLD MINING COMPANY (gold) (Washington corporation)
GRANITE DISTRICT GRANT COUNTY

Local name, Cougar mine.

Office: 505 Hyde Block, Spokane, Wash. Arthur B. Lee, Pres.; Chester C. Robbins, Sec.-Treas., both of Spokane; Jno. L. Rand, Baker, Attorney-in-Fact; Elmer C. Brain, Granite, agent. Capital stock, \$1,000,000; par value, \$1.00; all subscribed and paid up; \$568,050 issued. (1916 report.)

This company acquired the Cougar mine under bond and lease from the Cougar Gold Mining and Milling Company about April, 1916. The new company proceeded to make cyanide tests of the ore and remodel the old mill equipping it for all-slime cyanidation. A long pipe line was also installed to provide water for power and milling purposes. It will have a pulverizing and dissolving capacity of 125 tons provided by a crusher and 2 rolls, two 5-foot tube mills of short length, standard Pachuca agitation tanks and standard accessory apparatus. Steam will serve for power purposes until water power installation is completed. The mine is less than 1 mile from the transmission line of the Eastern Oregon Light and Power Company.

UTAH QUICKSILVER COMPANY (mercury) GOLD HILL DIST. JACKSON COUNTY

Incorporated about August 1, 1916. Incorporators, Alex Nibley, Edwin Jones and W. Y. Cannon of Salt Lake City, with a capital stock of \$50,000.

The property contains 35 claims near the Chisholm group.

The ore deposit consists of cinnabar in shear zone in andesite, the cinnabar being found over a wide territory in this section but usually quite low grade. The chief showing is on the Rainier claim where cinnabar deposits along with pyrite outcrops in an andesite fault breccia. The vein strikes N. 70° W. and contains black quartz 12 to 15 inches wide with a well defined wall.

The development work at this point consists of an open cut 12 to 15 feet deep exposing a vein some 20 feet in length. The vein is opened up in 2 or 3 other points thus tracing it for 3 or 4 hundred feet. The property is at present under option to Boston people.

VALLEY VIEW PROSPECT CORNUCOPIA DISTRICT BAKER COUNTY

See "Wild Irishman prospect."

VANGUARD PROPERTY JOSEPHINE COUNTY

See "Philips or Vanguard" property.

VESUVIUS MINES COMPANY (gold) BOHEMIA DISTRICT LANE COUNTY

Local name: "The Vesuvius Mine."

Office: Eugene, Oregon. Mine office: Bohemia, Oregon. E. M. Johnson, Pres.; F. J. Hard, Sec.-Treas. Capital stock, \$6,000,000; par value, \$1.00; all subscribed, issued and paid up. (1916.)

Located in Sec. 11, T. 23 S., R. 1 E., about 15 miles southeast of Disston which is the terminus of a 20-mile branch railroad from Cottage Grove.

The Vesuvius mine is the principal holding of the Vesuvius Mines Company, although the company has 50 quartz claims in all. It comprises 16 lode claims located on the western and southern slopes of Fairview mountain,

and the western slope of Bohemia mountain. The post office and principal store of the district is on the ground of the company.

The geology is comparatively simple, consisting of andesite flows interbedded with some andesitic tuffs. The andesite in some cases is somewhat altered, as calcite-filled amygdules have been noticed. The ore occurs in a mineralized fractured zone in the andesite. This zone strikes N. 60° W. Near the surface as shown in the upper workings, considerable oxidation has taken place and the rock is badly altered. At depth the principal ore minerals are galena, chalcopryrite, pyrite and sphalerite. The development work consists of 3 tunnels. The lowest is about 1200 feet below the outcrop and is driven along the fracture for a distance of 2000 feet. In places the mineralization is 3 to 4 feet in width and 25 to 50 feet in length. Then for long stretches the fractures contain but a small amount of quartz, and in many places the fracturing becomes very slight.

The main working tunnel is about 800 feet above the lowest and is about 2000 feet upon the vein. The vein material is oxidized but in respect to the quartz it is similar to that of the lower tunnel. There are several raises from this level and in a drift 76 feet above it, there is a lens of quartz about 3 feet wide. There is also a similar lens in a raise 40 feet above this drift. There is another tunnel on the vein 300 feet above the working tunnel and 100 feet below the outcrop.

In a prospectus made by the company, assays of \$7.50, \$20.64, and \$17.80 per ton on widths of from 18 inches to 3 feet are given. It is also stated that a profit was made on ore running only \$5.00 a ton, \$3.20 of which was free and caught by amalgamation, the other values saved by concentration.

There is a 10-stamp mill, amalgamating plates and tables which is driven by steam power, also a light plant, sawmill, etc., on the property.

Besides the Vesuvius mine, the Vesuvius Mining Company owns the following groups of mining claims: The Oregon-Colorado, The Utopian, and the Riverside.

Of these, the Oregon-Colorado has the most development work. The country rock is an andesitic breccia and an andesitic tuff. The development work consists of a tunnel 2000 feet along the fissure at a depth of about 900 feet below the outcrop.

Conditions are similar to the Vesuvius, fractured zones having a N. 60° W. strike and the chief ore minerals consisting of chalcopryrite, galenite, sphalerite and pyrite.

VICTOR MINE (gold)

GALICE DISTRICT

JOSEPHINE COUNTY

With reference to this property Diller says:

The Victor mine is about 7 miles from Galice on the West Fork of Galice creek. When in the region in 1911 I was unable to visit it, but Mr. C. L. Barlow, of Galice, informs me that the owners struck a rich vein and took out about \$2,500 in a month with a hand mortar. In 1912, 5 men were still at work and were averaging more than \$4 to the man a day.

VICTORIA MINING COMPANY

DURANGO, MEXICO

Office: Grants Pass, Oregon. A. Oldoerp, Little Rock California, Pres.; Louis F. Kraemer, Reading, Pa., Sec.-Treas. Capital stock, \$10,000; par value, \$100; capital stock all subscribed, issued and paid up. (1916 report.)

This company's properties are located in Durango, Mexico.

VINCENT CREEK GOLD AND COPPER COMPANY (copper and gold)

GREENHORN DISTRICT

GRANT COUNTY

Office: Austin, Oregon. Burton Miller, Prairie City, Pres.; Nellie Miller, Prairie City, Sec.-Treas. Capital stock, \$200,000; par value, \$1.00; \$100,002 subscribed and paid up; \$100,858 issued. (1916 report.)

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 chal-

copyrite 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.

VIRGINIA MINE (gold)**GREENHORN DISTRICT****GRANT COUNTY**

This property is located in Sec. 10, T. 10 S., R. 35 E., about 1/2 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.

VIRTUE MINES DEVELOPMENT COMPANY (gold)**VIRTUE DIST.****BAKER CO.**

Local name, Virtue mine.

Office: Baker, Oregon. J. K. Romig, Pres.; M. Boswell, Sec.-Treas. Capital stock, \$1,500,000; par value, \$1.00; \$1,475,845 subscribed and paid up; \$1,384,075 issued. (1916 report.)

Lands consist of Virtue Consolidated Group of 16 quartz claims and the Borman and Virginia placers, in all about 400 acres situated in T. 9 S., R. 41 E. Lindgren says.

As this mine is one of the earliest and largest producers in the whole region described it may be desirable to outline its interesting history more fully. It is 7 miles nearly due east from Baker City in an air line, and is situated in the foothills of the dry and barren ridges which partially fill the big bend of Powder river. The drainage around it is to the northeast into the lower part of the river; its elevation is 3,800 feet.

The discovery dates from 1862, and was due to the tracing up of rich placers filling the gulches below it. For ten years after its discovery it was known as the Rucker or Union mine. A great deal of work was done in early days, as shown by Raymond's report of 1870. From 1871 to 1878 it was worked nearly continuously, largely by Brown and Virtue. In 1878 it was sold to Grayson and Co., of San Francisco, and up to 1884 was worked in a more or less satisfactory manner. From 1884 to 1893 the mine was idle, but in the latter year work was resumed and continued with excellent results until 1898, when, after a short period of idleness, it was sold to the Consolidated Virtue Mine Company, of Montreal, Canada, also owners of the adjoining Collateral mine. After a short period of work in the upper parts of the mine, it was again closed on August 1, 1899. When visited the mine was, unfortunately, shut down. The property is equipped with a 20-stamp mill.

The production up to 1878 was \$1,250,000. From 1878 to 1884 \$200,000 is the estimated amount. From 1893 to 1898 the production was \$739,000, the maximum being reached in 1896 with \$259,000 and the minimum in 1898 with \$13,100. The total production is thus \$2,189,000.

The earlier developments consisted of three tunnel levels, the lowest of which is 300 feet below the croppings. From the lowest tunnel a vertical shaft was sunk 800 feet deep, and at each 100 feet crosscuts were made to the vein. The levels extend from 200 to 400 feet north and 800 to 900 feet south from the shaft.

The country rock is a greenstone of very fine grain and dull greenish-gray color, some of it having a serpentinitoid appearance. It is an old volcanic tuff or breccia, probably of the same age as the slates of the White Swan or the gabbro and diorites of Flagstaff. Much of it is so altered that its original character can be recognized only with difficulty. It has no slaty structure.

The vein strikes northwest and dips 45° to 80° S. W., its width varying from 6 inches to 12 feet, being on an average 14 inches. Southeasterly it may be traced into the adjoining Virginia mine.

The ore is a white, normal, coarse vein quartz with some drusy cavities. It contains free gold, which often is very coarse and shows imperfect crystallization; it is unusually pure, reaching a fineness of 940. The quartz contains an extremely small amount of sulphurets, consisting of a little pyrite and chalcocopyrite. Occasionally the quartz is banded by shearing, and this is considered the best rock. The country rock near the veins contains seams of calcite and pyrite, but ordinarily carries no value. The richest ore occurred near the surface. In 1870 the average yield was \$20 per ton; in 1873, \$40 per ton was reported; in 1875, \$24 per ton. From 1893 to 1898 the ore averaged \$15 or \$16 per ton. Still richer chimneys were occasionally found in the main ore shoot.

***** From the seventh level up, the ore was stoped for the full distance of the drifts, the ore shoot being practically 1,200 feet long. According to the earlier data in Raymond's report of 1870, the upper part of the shoot above the lowest tunnel level was much shorter. Mr. Grayson stated that "no stoping was done between the eighth and the seventh level, as the ledge matter was broken up and carried but slight values." The mine was then abandoned, and since that time it has never been unwatered.

An interesting feature is that the water in the shaft is very abundant and stands a short distance below the collar, that is, a couple of hundred feet above the level of the valley. Moreover, it is warm or tepid, so that it must represent an ascending column of the underground circulation. The high temperature was a serious obstacle to the working of the mine.

As may be expected, there are a great number of claims and prospects near the Virtue mine, but none of these have as yet proved important producers. The southeasterly extension of the Virtue has been worked by means of a shaft in the Virginia. Adjoining on the southwest is the Collateral, a vein said to be similar in character to the Virtue, and accessible by crosscuts from the lower levels of the Virtue workings.

The company now controls about 1 mile along the series of veins. Eight of these veins have been located but the larger part of the production came from the Virtue vein, the most northeasterly.

The property is equipped with crusher, 20 stamps, 5 vanners and 4 cyanide tanks with hoists, boilers, engines, motors, etc. Motive power was, until recently, steam but is equipped to be driven by electricity secured from the Eagle River Power Company with which it is connected by high line. We are not certain that the mine has been unwatered since 1899, but some ore has been extracted since then (1906-7) from mine above mill or drainage level and some \$1500 from ore on the dump. The production since 1900 has been only a few thousand dollars in all. The press from February to July, 1916, made frequent reference to a lease and bond having been given to George W. Field and Company, of Boston, the reported terms of the lease were 17½ per cent royalty the first two years and 20 per cent the second two years upon the gross receipts with privilege to purchase for \$400,000. Financial difficulties were encountered in connection with the Eagle River Power Company, an allied company, so that aside from the repair of the mill little has been done to date by the leasing company.

WAGNER CLAIM (placer)

SIXES RIVER DISTRICT

CURRY COUNTY

Diller says that at the time of his examination the Wagner claim, about a mile below the mouth of Butcher gulch in Sec. 20, T. 32 S., R. 13 W., was being worked by Mr. J. L. Searle and others from the state of Washington.

"The whole stream was dammed to a height of about 5 feet and 2 lines of sluice boxes were suspended on numerous logs felled across the stream. A steam pump and 9 men were employed."

WAGNER (G. P.) CLAIM

UPPER APPLEGATE DISTRICT

JACKSON COUNTY

G. P. Wagner has several claims about a mile west of Steamboat in Sec. 20, T. 40 S., R. 4 W., where he is removing ore brought to its present position by surface waters. In Rich gulch, which was mined by placer methods years ago, small quartz veins are known in the bed rock; one of them is nearly vertical and strikes N. 55° E. They are said to produce high grade ore.

WALDO CORPORATION (Washington corporation)

JOSEPHINE COUNTY

Office: Seattle, Wash. D. E. Skinner, 1621 L. C. Smith Bldg., Seattle, Pres.; Louis Levensaler, Union Club, Seattle, Vice-Pres.; L. B. Stedman, Holler Bldg., Seattle, Sec.-Treas. Capital stock, \$100,000; par value, \$100. George M. Esterly, Seattle, general manager. (A recent corporation.)

WALDO MINE (copper)

WALDO DISTRICT

JOSEPHINE COUNTY

The Waldo mine is located in Sec. 36, T. 40 S., R. 8 W., near the west quarter corner. This mine was operated by the Waldo Smelting and Mining Company but is now owned by DeWitt VanOstrand, of Phillips, Wisconsin; Dr. J. F. Reddy and Alva H. Gunnell, both of Grants Pass, Oregon.

A mill of 50-ton capacity is being installed to concentrate some of the lower grade ore found in the mine as well as the several thousand tons on the dump. This mine has shipped several hundred tons of ore during the past summer which was hauled from the mine by wagon 27 miles to Waters creek station and shipped from there to the Tacoma smelter.

The ore is a massive chalcopyrite associated with pyrrhotite and pyrite together with their oxidized products. These massive sulphides are found in different sized masses separated from each other and apparently having no relation to each other any more than individual pieces in any fault breccia have a relationship, one with the other. Whatever has been the origin of the ore and whatever may have been the shapes, dimensions of the shoots, and structure, a very marked shearing movement has taken place involving the original ore body shattering it and scattering the separate blocks through a brecciated or crushed rock zone, a large part of which zone is serpentine. It is found that there is no relation in strike and dip between the ore masses found in this brecciated zone. Serpentine is usually the wall rock although sometimes diorite or an andesite locally known as "vein rock" may be found on the wall of some of the masses. This is probably due to the fact that sometimes a single mass in this large brecciated zone may be made up of both country rock and massive sulphide, has been able to preserve its identity and has not suffered the punishment common to some of its neighbors.

If the above analysis of the main geological factors which have affected commercial mining conditions at this property are correct these unrelated masses of sulphides may be found at greater or less intervals, both laterally and vertically in this fault zone and it would seem to the writer that a system of prospecting this territory in a large way by drilling might be inaugurated with profit.

WALDO SMELTING AND MINING COMPANY (Colorado corporation)

WALDO DISTRICT

JOSEPHINE COUNTY

Office: Colorado Springs, Colorado. Spencer Penrose, 301 Mining Exchange Bldg., Colorado Springs, Colorado, Pres.; Charles L. Tutt, Colorado Springs, Sec.; J. A. Hull, Colorado Springs, Treas.; C. E. Tucker, Takilma, Oregon, Attorney-in-Fact. Capital stock, \$3,000,000; par value, \$100; all subscribed, issued and paid up. (1916 report.)

For a description of the mine formerly owned by this company see Waldo mine.

WALL (P. L.) CLAIMS

SIXES RIVER DISTRICT

CURRY COUNTY

In Sec. 21, T. 32 S., R. 13 W. Discovered May 1, 1915. In August, 1915, a 20-foot open cut exposed a 1 to 4 foot rusty quartz seam.

WALLACE AND HADLEY CLAIMS (placer) SIXES RIVER DIST. CURRY COUNTY

Tom L. Wallace and Oliver C. Hadley own 2 placer claims on the south fork of Sixes river known as the South Fork Nos. 1 and 2, the re-location of which was recorded January 1, 1915. This property was originally called Thompson Flat. They began work in March and had 160 feet of pipe on the claim when the examination was made. The first gravel was washed in May, and it is claimed that \$165 worth of gold was taken out during the spring of 1915. It is said that the values are confined to within about one foot of the bedrock, with the greatest proportion of the gold directly on the bedrock, and that no clay is present to interfere with the saving of the gold. Very little platinum is found in this ground, and no attempt to save it has been made.

WALLA WALLA GROUP (copper, gold and molybdenum)

WALLOWA DISTRICT

WALLOWA COUNTY

This property is at Aneroid lake in Sec. 34, T. 4 S., R. 45 E., at an elevation of about 7000 feet. It is about 13 miles south of Joseph, the railroad terminus near the head of the east fork of the Wallowa river. For 6 miles out of Joseph is a good wagon road, while the remaining 7 miles is by trail.

It is a contact-metamorphic deposit between intrusive granodiorite and limestone.

Development work has been done in 2 places on the contact between the limestone and the granodiorite. One is in the abrupt walls just above the lake, and the other is along the contact some few hundred feet to the northwest.

At the latter place a tunnel, about 100 feet long, is driven near the contact in the altered granodiorite, but attains less than 50 feet in depth. The mineralized zone is about 20 feet wide, although the granodiorite is altered to a greater width. Typical contact-metamorphic minerals, such as garnet and epidote are found, and the recrystallized limestone contains some quartz. Sometimes the garnet and epidote crystals are very small, but frequently are as much as three-fourths of an inch in diameter. The altered granodiorite is impregnated with chalcopyrite in spots, and small indistinct veins of molybdenite also occur.

A better place to observe this contact is on the abrupt walls above the lake, where it is exposed for several hundred feet with widths up to 50 feet.

The mineralization is similar to the one just described, but considerable chalcocite is present. This high-grade copper mineral is disseminated along the contact zone for some 200 feet and for considerable widths. It is found both in the altered granodiorite and in the recrystallized limestone, although more of it is seen in the latter. The intergrowth of garnet, epidote, and quartz is usually fine-grained. Besides chalcocite, small amounts of molybdenite and chalcopyrite are present. A lamprophyre dike cuts the contact along the sides of which chalcocite is much increased within the contact zone. The dike itself contains considerable disseminated pyrite. It looks as if the intrusion of this dike or the action following it had aided in the dissemination of chalcocite.

This contact with its metamorphic zone has been developed but little, and much of this could have been done to greater advantage. The crosscut started some distance below the contact in the loose rock and has not yet reached it. The outcrop is so situated that it would not be very hard to develop it with open cuts.

It is reported that developments of 1915 or 1916 made a very satisfactory showing of copper ore by crosscutting the contact in close proximity to the lamprophyre dike.

WALLOWA COUNTY MINING AND DEVELOPMENT COMPANY (copper-gold)
WALLOWA DISTRICT WALLOWA COUNTY

Local name, Williams mine.

Office: Enterprise, Oregon. Jesse Walker, Pres.; J. A. Burleigh, Enterprise, Sec.; George W. Williams, Wallowa, Treas. Capital stock, \$200,000; par value, \$1.00; all subscribed, issued and paid up. (1916 report.)

This company owns 14 claims on Lick creek, Wallowa country, Oregon, in about Sec. 3, T. 5 S., R. 46 E., 9 miles east and 13 miles south of Joseph, the railroad terminus from which the mine is reached by a 25-mile wagon road.

It is reported to be a quartz vein containing a small percentage of gold-bearing chalcopyrite. The nature of the country rock is not reported.

WATERMAN PROPERTY (gold) SPANISH GULCH DISTRICT WHEELER COUNTY

The property is owned by E. O. Waterman. Located in about Sec. 12, T. 13 S., R. 24 E., about 2 miles southeast of Antone.

The country rocks are greenstone, limestone and argillite cut by aplite dikes. The deposit is a distinct regular quartz fissure vein, having a strike of N. 60° E. and dipping 45° S., with an average width of 2 feet, and a maximum width of 5 feet.

Development consists of a shaft about 125 feet deep on the vein. No assays are available. Near this property there is evidence of chromite deposits.

WATKINS COAL COMPANY**WASHINGTON**

Office: Third and Washington Sts., Portland, Oregon. Edward Cookingham, Ladd and Tilton Bank, Portland, Pres.; R. S. Howard, Portland, Sec.; Albert Cookingham, Tacoma, Washington, Treas. Capital stock, \$25,000; par value, \$100; \$12,800 subscribed, issued and paid up. (1916 report.)

This company's properties are located in Lewis county, Washington.

WAY CLAIMS (placer)**SIXES RIVER DISTRICT****CURRY COUNTY**

At the time of this investigation, Mr. C. W. Way was working 3 placer claims, the Rainbow, Robert Harrison fraction, and the Nugget Patch, acquired by purchase in 1912. These have been worked by hydraulicking from the time they were purchased. The property is equipped with 800 feet of flume and 600 feet of pipe. It is claimed that \$700 worth of gold has been taken out of this ground, and that the values are confined largely to a point in the gravel just above the bedrock.

Mr. Mitchell gives the location of this property as being just below the Wallace and Hadley claims on the south fork of Sixes river.

WEAVER MINE (placer)**SUMPTER DISTRICT****BAKER COUNTY**

This placer mine is in Secs. 26-27, T. 9 S., R. 36 E. and 4 miles by wagon road west from Sumpter.

The following extracts are quoted from a report by Pardee:

The Weaver mine is situated near the head of the north prong of Buck gulch, in a gravel terrace hanging upon the north slope some 200 feet above the bed of the ravine. Its elevation above sea is 5,550 feet. It extends as an ill-defined bench, having a course approximately east and west, 1,000 feet or more, its western termination not being exposed. In its eastern portion pits 50 to 90 feet wide and aggregating 450 feet in length have been made, exposing a bank 40 feet high. These openings have apparently reached not more than halfway across the deposit. In part the gravel rests unconformably upon loosely consolidated fine sands and silt, which in turn rests upon a bed rock of cherty shale and basic igneous intrusive rocks. The gravel consists of smooth rounded cobbles of an average diameter less than 12 inches, in an abundant sandy matrix that is very loosely "cemented"

Gold is distributed throughout the gravel, but is found in greater quantity in the lower layers. It occurs mainly as small half-rounded grains of pin-head size and dust, with occasionally a small nugget. Its fineness is reported as 900 to 940.

The Weaver property is equipped with a small hydraulic plant and supplied with water through a ditch about 6 miles long that diverts the flow of Grays gulch, a tributary of McCullys Fork. Water in sufficient amount for mining purposes is had only during part of the spring and summer.

This mine has been operated profitably during the past nine years, but a statement of its output and the average yield of the gravel is not available for publication. The sluices here yield a considerable amount of "black sand," a sample of which was examined in the Survey laboratory. A few specks of platinum were detected in it by D. T. Day. It contained in addition a globule of gold amalgam and a few small flattened particles or "colors" of rusty gold.

South and southeast of the Weaver mine, on the opposite slope of Buck gulch, and on the divide between it and Mosquito gulch, fragmentary patches of gravels are poorly exposed at elevations of 5,500 to 5,600 feet. They greatly resemble the gravel of the Weaver mine and are thought to belong to the same stream system. On the divide mentioned they are apparently overlain by andesitic tuff.

WESTERN CONSOLIDATED MINES COMPANY**CALIFORNIA**

Office: 701 Spalding Bldg., Portland, Oregon. A. N. Wills, Pres.; M. B. Bozworth, Sec.-Treas., both of Portland. Capital stock, \$50,000; par value, ten cents; \$50,000 subscribed and paid up; \$5,316.50 issued. (1914 report.)

Dissolved by proclamation in January, 1917.

This company has abandoned its property which was located in California on the East Fork of the Illinois river between the Preston Peak group of mines and the Takilma property, about 8 miles from Waldo, Oregon.

WESTERN METAL MINES COMPANY

Filed articles of incorporation in March, 1916.

L. E. Crouch, E. O'Keane, A. E. Gibhardt, of Portland, incorporators.
Capital stock, \$100,000.

WEST COAST MINES COMPANY (gold) BOHEMIA DISTRICT LANE COUNTY

Local names, Champion mine, Musick mine, Helena mine.

Office: 210 Chamber of Commerce Bldg., Portland, Oregon. W. J. Zimmerman, Pres.; W. M. Cake, Sec., both of Portland. Capital stock, \$1,500,000; par value, \$1.00; amount subscribed, \$890,000, issued and paid up. (1916 report.)

This property is now under lease to H. C. Mahon, of Portland. W. W. Elmer is manager. The entire property consists of 47 claims, including 3 mines, local names of which are Champion, Musick and Helena. Of these, the Champion is the largest. It is located in Sec. 13, T. 23 S., R. 1 E., about 12 miles southeast of Disston which is the terminus of a 20-mile branch railroad from Cottage Grove.

The wagon road from Disston to the Champion mine is in good condition and could easily be put in first class shape. The country is rugged and plenty of timber is available.

The region is made up of a series of andesitic flows which are for the most part dark in color and finely crystalline. There is no evidence of intrusive rock in this immediate vicinity but nearby regions show intrusions of granodiorite porphyry into the andesites. The mineralization was probably caused by heated solutions rising from a deep seated intrusion, and it is found in highly altered and mineralized fractured zones. As a rule these zones have a N. W.-S. E. direction with a nearly vertical dip. Oxidation has taken place to about 200 feet below the surface. Below this the chief ore minerals are pyrite, galenite, and a little chalcopyrite and sphalerite. At a still greater depth, the pyrite diminishes, and chalcopyrite, sphalerite and galena become the principal ores.

In the Champion mine, the main lode has an average width of 3 feet with a maximum width of 8 feet of brecciated material cemented with quartz. Sometimes there are masses of quartz as much as 4 feet thick. The strike is about N. 60° W. Dip nearly vertical. The lode has been traced for 2000 feet on the surface. The ore shoots in the lode dip to the southeast and in many cases there are lens-like stringers of pure galena sometimes a foot in width, crossing the lode. As might be expected the values are very irregular. It is said that an ore shoot which runs from \$35 to \$50 per ton in the richer portions will rarely go below \$10 to \$7 per ton in the low grade portions. However, if it is \$7 in the richer part, it might not be possible to mine the low grade portions at a profit.

The Champion mine has many hundreds of feet of workings. At present the No. 9 crosscut tunnel to the No. 9 level is the main adit, although the No. 12 crosscut adit is being driven to the lode.

Previous production of the Champion mine is reported to be \$1,700,000. The ore cars as they come from No. 9 tunnel are taken down a cableway 3000 feet long to the mill about 1000 feet below. Mill consists of 20 stamps and concentrators operated by electric power derived from a power house which is located 8 miles down the creek.

The Musick mine is located near Bohemia mountain about 1 mile to the southwest of the Champion. The geology is quite similar. Main lode has a width from 5 to 15 feet and has been traced on the surface for 5000 feet. The ore shoots probably dip to the southeast. Oxidized zone extends to a depth of 200 feet from the surface, although some sulphides are present along the first 100 feet of depth. Below this, there is not much oxidation and the

sulphides do not seem to change with greater depth. The principal minerals are galena, sphalerite and chalcopyrite.

Development work consists of tunnels, raises, etc., and much ground has been stope. The reported production is \$180,000.

The ore from the Musick mine has been trammed in cars to one of the upper levels of the Champion, dropped to the No. 9 level in that mine, and then to the mill.

The Helena mine is located about 1 mile to the northwest of the Champion in Sec. 7, T. 23 S., R. 2 E. At the time of the examination it was practically inaccessible. However, the mineral occurrence as judged from specimens on the dump is similar to the other mines in this vicinity. Production of the Helena is said to be \$150,000, and practically all of this was taken from an oxidized zone near the surface.

WEST (DAVID) PLACERS

GRANITE DISTRICT

GRANT COUNTY

For description see "North Fork mine."

WEST SHORE OIL COMPANY

COOS COUNTY

Office: Bandon, Oregon. O. A. Trowbridge, Pres.; C. R. Wade, Sec.; A. McNair, Treas., all of Bandon. Capital stock, \$50,000; par value, \$1.00; \$23,571 subscribed, issued and paid up.

The property of this company is located 18 miles southeast of Bandon, Oregon, and is held under a lease. The lease covers 640 acres and runs for 20 years and is perpetual, if or so long as oil is obtained in paying quantities in well when completed. (1916 report.)

WEST SIDE GOLD AND SILVER MINING COMPANY (gold and silver)

GREENHORN DISTRICT

GRANT AND BAKER COUNTIES

Local name, West Side mine.

Office: Yamhill, Oregon. J. A. Simmons, Pres.; Richard Baird, Sec.; W. G. Busbee, Treas., all of Yamhill. Capital stock, \$10,000; par value, one cent; \$8,143.07 subscribed, issued and paid up. (1916 report.)

This company owns 4 patented quartz claims adjoining Greenhorn City on the west.

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.

WHITE ELEPHANT PROSPECT (gold) CORNUCOPIA DISTRICT BAKER COUNTY

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

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

WHITE HORSE MINING COMPANY (placer) GOLD HILL DIST. JACKSON CO.

Office: 1124 Board of Trade Bldg., Portland, Oregon. I. G. Davidson, Pres.; J. F. Boootin, Sec.; J. M. Leiter, Treas., all of Portland. Capital stock, \$100,000; par value, \$5.00; all subscribed, issued and paid up. (1916 report.)

This company owns placer ground 3 miles northeast of Gold Hill in Sec-3, T. 36 S., R. 3 W. There is no activity at the property.

WHITED MINING COMPANY (gold)

BAKER COUNTY

Local name, Whited property.

This company filed articles of incorporation in November, 1916, with a capital stock of \$15,000; par value, \$1.00; Alfred Whited, Pres.; Grace A. Whited, Sec.-Treas., both of Unity, Oregon.

This property is located $5\frac{1}{2}$ miles south of Unity on the steep, well timbered western slope of Bull Run creek. This group of 8 claims is owned by Alfred Whited and Joe Wahn and operated by C. J. Johnson and Edward Elge.

The vein is near the border of an intrusive granodiorite into greenstone with the usual complex dikes. The principal ore shoot following the hanging wall of one of these porphyry dikes has a strike of N. 45° E. and dips 80° N. W. The width of the mineralized zone is 4 feet. There is but little quartz evident in the vein. The greenstone on the hanging wall of the dike is much serpentinized.

The development work consists of 2 crosscut tunnels and drifts upon the vein in each. In the lower and principal crosscut there is a 40-foot winze and a drift north 35 feet where a small amount of ore has been stoped. The ore is a gold ore but the other minerals are copper and iron which have been largely oxidized in the workings so far developed. There is a 10-stamp mill upon the property operated by water power. This mill has amalgamating plates and Wilfley tables. It was in operation in September, 1916, when a visit was made to the property.

WHITNEY MINE (gold)

GOLD HILL DISTRICT

JACKSON COUNTY

The Whitney mine 2 miles east of Gold Hill is in the N. E. $\frac{1}{4}$ S. W. $\frac{1}{4}$ Sec. 13, T. 36 S., R. 3 W. in a coarse subsiliceous rock not far west of the tonalite border. The main entry at an elevation of 1375 feet, is a crosscut for 130 feet; at 10 feet from the portal a vein said to have produced high grade ore strikes N. 50° W. and dips 60° S. W. At 70 feet from the portal a drift follows vein No. 1 for 290 feet; this vein contains 2 to 5 feet of soft material with stringers of quartz; it strikes N. 67° W. and dips 55° to 75° S. W. At the breast of the crosscut a raise follows vein No. 2 which has a 3-foot vein-filling like the preceding and is about parallel with it. In these workings small stringers of aplite are common generally standing about vertical and trending north. In another adit only 20 feet vertically higher, the No. 2 vein is found to be in a granitic dike while the No. 1 vein is on the granite contact about 30 feet distant. At this level the latter is a shear zone carrying a little quartz. Several smaller veins have been explored for short distances. One of them contains some chalcopyrite in places. At the intersections of these veins with the larger ones good ore has been found. A subsiliceous rock containing considerable magnetite is associated with these veins and not found elsewhere on the hill. It appears to be a contact phase rather than a separate intrusion. In thin section it is found to consist of coarse augite and magnetite with a little olivine and brown hornblende.

WHITNEY PLACER**GREENHORN DISTRICT****BAKER COUNTY**

In the southern part of T. 10 S., R. 36 E. and extending almost across it is the Whitney valley with Burnt river flowing through it. The headwaters of Burnt river rise in the Greenhorn range and many placer diggings such as Winterville and Parkerville are drained by it. The gravels of Whitney valley were prospected by test pits and churn drilling in the fall of 1915 and the spring of 1916. The depth to bedrock was found to be from 7 to 20 feet and some of the test pits are known to be of good grade for dredging purposes, but whether or not there is sufficient acreage of gold-bearing gravels to warrant the installation of a dredge has not been announced.

WILD IRISHMAN PROSPECT (gold) CORNUCOPIA DISTRICT BAKER COUNTY

The Wild Irishman vein, now called the Valley View is located about $\frac{1}{2}$ mile west of the White Elephant and about $1\frac{1}{2}$ miles west of the Union Companion mill. It cuts across the southeastern end of Granite mountain at an elevation of about 9000 feet. The vein has a maximum width of 6 to 8 feet and can be seen from the apex of the mountain to continue clear across Bonanza basin and up the other side. It is probably a continuation of the Red Cross vein. Some of the quartz in the vein shows well-formed crystals. The strike is N. 20° E. and the dip 50° to 60° W.

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

WILLIAMS AND ADYLOTT MINE (gold)**ILLINOIS RIVER DISTRICT****JOSEPHINE COUNTY**

Concerning this mine Diller says:

A number of claims on Hoover gulch, about 8 miles directly northwest of Kerby, are owned by Williams and Adylott. The claims were seen from a distance only. The country rock is mainly greenstone and greenstone tuffs, which are well exposed in the bluffs about the head of the gulch, but there is an intruded mass of serpentine also in the neighborhood and possibly, too, some cherty slates and quartzites related to those at the head of Hoover gulch.

A shaft has been sunk 40 feet in rock that is said to contain gold all the way down. The residual material has been piped off and \$500 cleaned up, though much of the gold is reported to have been lost.

WILLOW CREEK PLACER**MALHEUR COUNTY**

About 3 miles east and down stream from Ironside post office near the eastern side of T. 14 S., R. 39 E. is the placer ground owned by Ben Matthiesen and C. M. Ford. Bed rock is about 20 feet from the surface and the upper half or two-thirds is soil and clay and nearly all the gold is close to bedrock. The ground is flat and Willow creek flows through it so that the earth and gravel must be elevated to be washed and disposed of and water also must be kept out. To accomplish this, a 10 H. P. gas engine and a 4-inch centrifugal pump was installed which elevates the earth, water, gravel and mud, after it has been ground-sluiced in the sump. Nearly all the gold is coarse, ranging in size from that of a pin head to a maximum of \$14 and is reported to run about 75 cents per cubic yard.

WILSON BASIN MINING AND DEVELOPMENT COMPANY

Out of business.

WINKLE BAR (placer)**MULE CREEK DISTRICT****CURRY COUNTY**

Diller describes this property as follows:

Nearly a mile below the mouth of Ditch creek and 26 miles below Galice, on the right bank of Rogue river, is a large terrace known as Winkle bar. It contains perhaps 30 acres. The slate bed-rock terrace rises about fifteen feet above low water in the river, and is capped by 20 to 30 feet of gravel which is generally coarse, half of it consisting of boulders over 5 inches in diameter. A small placer operated here some years ago and a test shaft

encourages the Winkle Bar Developing Company to plan for larger operations. Ditch creek, with a few miles of ditch, will supply water with a head of 120 feet. The gold is fine and will require special precaution for its recovery.

WINTERS AND McPHERSON PROSPECTS (gold)

ILLINOIS RIVER DISTRICT

JOSEPHINE COUNTY

Concerning these prospects Diller says:

Lightning gulch is a tributary of Canyon creek west of the serpentine belt and traverses essentially the same horizon as the north fork. The greenstones are greatly sheared and cut in some places by dikes related to dacite porphyry. Near by are banded siliceous rocks which resemble quartzites and probably, like the cherts of the North Fork of Canyon creek, belong to sedimentary masses.

Near the mouth of Lightning gulch, J. A. Winters has run a number of prospect tunnels into black slates or along their contacts with greenstone. The rocks at this place are much disturbed by slides, and although they may in some places average several dollars a ton, the source of the gold is difficult to trace. Some of the gold, however, appears to be in the slates, whose bronze slickensides are due to shearing movements after the deposition of the ore.

Some distance up Lightning gulch Eugene McPherson has a mine tunnel 200 feet in length that follows the contact between greenstone and banded quartzite. The greenstone is greatly altered and the contact is very irregular. A small quantity of rich telluride ore is reported to have been stoped from this tunnel. I was unable to obtain a sample of the ore at the mine, but a small fragment was given me by Mr. Bowden, who assured me that it came from the McPherson tunnel. Mr. Bowden also gave me a sample from his own prospect farther northwest, on Lightning gulch. Both samples reacted strongly for tellurium, giving a decided purple solution when boiled in concentrated sulphuric acid.

WINTERVILLE AND PARKERVILLE DIGGINGS GREENHORN DIST. BAKER CO.

The now deserted camps of Winterville and Parkerville are situated a mile east and a mile south, respectively, of Geiser. At these points deposits of Tertiary pre-tuff-breccia gravels have been mined by hydraulic methods. The total production is unknown but has been estimated, on the basis of 50 cents per cubic yard for the volume of gravel worked, at a minimum of \$145,000. Of late years activity has been confined to the Winterville diggings which have intermittently produced small amounts.

The Winterville deposit is situated on the slopes adjoining Bennett creek in Sec. 16, T. 10 S., R. 35½ E. The work at present is being done entirely on the gravels west of the stream, those east of it having been worked out a long time ago. In 1900, when visited by Lindgren, the Winterville mine was being operated on a larger scale than at present, and but little can be added to the following description quoted from his report.

The gravels washed at present are found about the level of the creek (Bennett creek) and on its western side. The area which thus far has been hydraulicked comprises about 3 acres, the banks being from 15 to 20 feet high. The bed rock is a serpentine greenstone of uneven surface. A north-south fault in the bed rock has been exposed 100 feet long and showing a scarp 30 feet high which dips 60° E. The pay gravel, resting on the bed rock, is from 3 to 10 feet thick, not very coarse, and sometimes cemented. It contains pebbles of serpentine, quartzite, slate, and quartz. Above this rest 15 feet of clayey beds with small strata of coaly material. Above this follows 2 feet of hard cemented gravel, covered by andesitic tuffs and breccia. The gold, found chiefly on the bed rock, is extremely coarse, the pieces ranging from 0.05 ounces up to 15 ounces in weight, but at the same time very well washed. Most of the nuggets have an oblong flat shape. The fineness averages 900. This interesting deposit was clearly formed before the time of the Neocene andesitic eruptions and must be of Eocene or early Neocene age.

Since Mr. Lindgren's examination the pit west of Bennett creek has been worked back a distance of 1000 feet or more and two other faultscarps have been exposed. One forms a wall 20 feet high that strikes N. 60° W. dips 65° N. E. and crosses near the middle of the pit. The other forms the present south boundary of the workings. It presents a curved wall 40 feet high that varies in trend from eastwest to southwest and dips steeply northward. In addition, other small displacements are shown, the net result of all being a rapid elevation of the bedrock southward and westward, although it dips in these directions.

The Parkerville mine in Sec. 18, T. 10 S., R. 35½ E. had been idle for some time, and therefore the gravel banks were not so well exposed at the time of the examination as those at Winterville. Enough was seen, however, to make certain that the two deposits are identical in character and composition. The bedrock here is cut by faults that dip in the same direction as those of the bedrock at Winterville and cause displacements in the same manner. The two mines are undoubtedly situated upon portions of the same gravel channel.

The intervening space of about a mile and a half comprises a divide 300 feet high composed of tuff-breccias. If the buried channel remains level or nearly so between the exposed portions it is too deeply buried to allow of any other method of working than by drifting. It is probable, however, that step faults, similar to those observed in the two pits that have been excavated exist in the lands between. If this is true the gravel bed, to some extent at least, ascends the hill from Winterville by steps and descends to Parkerville due to its dip slope.

West of Parkerville this erratic deposit is fully 40 feet thick and dips beneath the tuff-breccias at an angle of 12°; it is not known to appear at the surface farther west.

WOLF CREEK MINING AND DEVELOPMENT COMPANY (placer)
GREENBACK DISTRICT JOSEPHINE COUNTY

Office: 702 Spalding Bldg., Portland, Oregon. A. N. Wills, Pres.; M. B. Bozworth, Sec.-Treas., both of Portland. Capital stock, \$1,000,000; par value, \$1.00; \$15,806 subscribed, issued and paid up. (1916 report.)

This company owns 80 acres of placer ground on Wolf creek in Josephine county. The property has been idle for several years.

WOODARD GROUP EAGLE CREEK DISTRICT BAKER COUNTY

See "East Eagle Mining and Milling Company."

WOODROW PROSPECT (gold) EAGLE CREEK DISTRICT BAKER COUNTY

Owned by Mike Woodard, of Baker, Oregon. Located about 13 miles from Sparta and 43 miles northeast of Baker, in the northwest part of T. 6 S., R. 44 E. on the west side of the rather steep canyon of East Eagle creek at an elevation of about 5300 feet. There is but little timber in the immediate vicinity although there is plenty at no great distance.

The country rock is a rather coarse grained volcanic breccia, somewhat altered so that now it has a light greenish color. The quartz vein occupies a narrow but persistent fissure. It is quite regular in width, averaging 18 to 24 inches with strike N. 30° W. dip 50° W. There is a later basalt dike 50 feet wide on the hanging wall. On the surface the vein has been traced for 500 feet by means of small cuts and it is said that every cut pans well. It has been developed by a 100-foot drift having a maximum depth of 50 feet and by a 25-foot winze sunk on the vein about 20 feet from the portal of the tunnel. No assays are available, but samples panned by Mr. Woodard appeared to run about \$50 per ton.

WRAY (CHAS.) CLAIMS (gold and copper) NEW ELDOADO DIST. GRANT COUNTY

This property is located on a shear zone which is mineralized in plates. Pyrite is the chief ore mineral. Pyrrhotite and some chalcopyrite are also present. This zone strikes about N. 60° E. and appears to be somewhat similar to those on the southern slope of the Wallowa range of which the Poorman is a type, although the shearing and percentage of copper is much less. How much gold and silver is present in this copper claim was not learned.

WRIGHT MINE (gold) UPPER APPLGATE DISTRICT JACKSON COUNTY

The Wright mine 2 miles east of Applegate is near the south line of Sec. 14, T. 38 S., R. 4 W. near Humbug creek. It is opened by two adits, the upper running 80 feet north in decomposed "granite" to dense hard greenstone while the lower runs 150 feet north and thence 20 feet west; it enters in decomposed "granite" which becomes harder as the contact is approached. At the turn, and beyond, the adit is in hard greenstone with quartz here and there apparently produced by replacement. No well defined vein is visible. The ore consists of mineralized greenstone containing free gold, galena, and sphalerite.

WRIGHT AND MYER CLAIM (gold) UPPER APPLGATE DIST. JACKSON COUNTY

Wright and Myer have a mine 3 miles northwest of Steamboat in the S. W. $\frac{1}{4}$ Sec. 17, T. 40 S., R. 4 W. at an elevation of about 3200 feet as measured by barometer. An adit crosscuts 30 feet to a vein which is followed 70 feet N. 60° W. The vein contains a little chalcopryite and is said to average \$28 in gold per ton. Pyrite disseminated in the andesite wall rock is said to carry \$16 a ton in gold and very little copper. The vein plays out upward but the surface workings are on a vein dipping 50° N. E. while the lower vein dips 75° S. W. Adjoining claims have ore containing arsenopyrite, pyrrhotite, and chalcopryite in quartz. Wright and Myer have a 2-stamp mill with an 8-foot plate and one jig operated by a gasoline engine.

YELLOWHORN MINE (gold) GREENBACK DISTRICT JOSEPHINE COUNTY

The Yellowhorn mine is in the S. W. $\frac{1}{4}$ Sec. 4, T. 34 S., R. 5 W. about a mile south of the Greenback mine and $\frac{1}{2}$ mile northeast of Placer, Oregon. It is owned by Mr. Clemens, of Placer. It is opened by an adit about 800 feet long in greenstone which follows a vein for 650 feet. The vein varies in thickness from 6 inches to 4 feet with an average of about 10 inches, and is in a rock which contains many stringers. The vein filling is chiefly white quartz with some calcite, pyrrhotite, chalcopryite, pyrite, and galena. A thin section shows that the calcite is of later origin than the quartz. Pyrite is more abundant in the wall rocks near the vein than in the vein itself. The vein strikes nearly east and west.

YELLOW KING MINE (gold) JACKSONVILLE DISTRICT JACKSON COUNTY

The Yellow King mine, 4 miles northwest of Jacksonville, on Jackson creek is owned by the Medford Mining and Milling Company; in Sec. 26, T. 37 S., R. 3 W. at an elevation of 2800 feet, as measured by aneroid barometer. A crosscut adit extends N. 17° E. about 240 feet; at the face drifts run about 20 feet in a 3-foot vein with quartz seams and some sulphides. The country rock is a dark massive andesitic rock; all the vein matter is hard and impervious. At 197 feet from the portal the adit cuts a vein marked by much fault gouge and very wet; the walls are well defined, but there is little quartz and less pyrite in this vein, which strikes S. 83° E. and dips 77° S. At a shaft on the hillside to the south at an elevation of about 2900 feet free gold is visible in iron-stained quartz.

YELLOWSTONE MINING COMPANY (gold) BAKER DISTRICT BAKER COUNTY

The Yellowstone Mining Company's (dissolved Jan. 11, 1916) property in McCord gulch, in Sec. 7, T. 9 S., R. 39 E. is in slate and black limestone cut by many kinds of dikes. The 2 principal veins upon this property are the Old Soldier and Tom Paine. The former is 3 feet in width and is developed by 2 tunnels, one of which is about 60 feet and the other some 600 feet long. The Tom Paine vein varies in width from a few inches to several feet as seen in several hundred feet of development.

Along Washington gulch there are many prospects, but for the most part the veins are small and the mineralization and shattering are but slight.

YOUNG AMERICA PROSPECT (gold) BAKER DISTRICT BAKER COUNTY

The Young American prospect, situated about $\frac{1}{4}$ mile up the creek from Carpenter Hill mine in Sec. 8, T. 9 S., R. 39 E. is also in greenstone, and the development is upon a massive quartz vein which has a maximum width of 5 feet.

ZENITH MINING COMPANY GRANITE DISTRICT GRANT COUNTY

Office: 321 American Bank Bldg., Tampa, Florida. Henry Leiman, Pres.; A. B. Filogamo, Sec., both of Tampa, Fla., and Emmett Callahan, Asst. Sec., Portland, Oregon. Capital stock, \$1,000,000, par value, \$1.00; all subscribed, \$664,445 issued and paid up. (1914 report.)

The property consists of the Zenith, Putman, and Chance quartz lode mining claims near Granite, Baker county, Oregon. The property was not identified in the field.

THE MINING DISTRICTS OF OREGON

GEOLOGY AND NATURAL FEATURES

Oregon possesses deposits of a great number of the useful minerals. On account of its vast size, however, (having an area of over 95,000 square miles) in comparison with its population (which is about 700,000) much less is known of them, and fewer have been made use of than is true of the mineral resources of most of the neighboring states.

Ores of the precious metals have been mined in the various mountainous sections of eastern Oregon since 1861 and in the southwest counties of the state for the past sixty-five years. The main streams in these sections have also 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 and its associates of the rarer metals is produced annually. Although it was a secondary product of gold and silver ores before that date Oregon began its regular shipments of copper in 1905.

Oregon supplies its own needs in building stone, clays and the common clay products, and possesses an abundance of raw materials for making lime and Portland cement. It has inexhaustible supplies of sand and gravel which are suitable and 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. Large deposits of gypsum along its eastern edge are being worked and the products shipped into neighboring states. Various other non-metallic minerals exist in the state of which there has been but little or no production to date, for economic reasons, or because of the lack of a thorough knowledge concerning them.

Oregon is similar in many ways to its sister coast states. Cutting across it from north to south are the two main ranges of mountains, the Cascades and the Coast range, both of which continue into Washington on the north and California to 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, there are a number of scattered lesser mountain ranges rising from a more or less level elevated plain, besides the main area of the Blue mountains, which consists of several ranges and occupies most of the northeast counties of the state. It is in these rugged mountains of eastern Oregon that the most active mining operations are being carried on at the present time and where the 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 state of Oregon is just beginning to fully realize. Between the Cascade and the Coast range, and extending from the Columbia southward for nearly 200 miles, lies the celebrated Willamette valley, traversed its entire length by the Willamette river. In places the floor of this valley is 25 miles wide and this with the contiguous foot-hills comprise 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 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 eastern Oregon consists of rolling uplands suitable for wheat growing and the raising of live stock. It will thus be noted that Oregon possesses a great diversity of land surface, and a corresponding variety of industries besides its mining interests.

Main trunk lines of railroad now reach practically all parts of the state as will be seen by a glance at the map. The Southern Pacific railway, with its many feeders, traverses the state from north to south, passing through the most productive portions of western Oregon and in California, connecting also with both water and rail lines at Portland practically at the north border of the state. The Oregon Electric railway operates lines throughout the length of the Willamette valley. Coast points are reached through passes in the Coast range and by means of coastwise boats between San Francisco, Portland and Seattle. Practically throughout its 300 mile course as the north boundary of the state, the Columbia river is paralleled by two trans-continental railway lines, the S. P. & S. railroad or "North Bank" on the Washington side and the O.-W. R. & N. railroad on the Oregon side of the river; both of which enter the city of Portland. The main Portland-Ogden line of the O.-W. R. & N. cuts across and taps the most important mining, farming and stock-raising sections of northeastern Oregon; while branch lines from both of these roads reach far south into the interior and central districts of eastern Oregon.

The mineral deposits of economic importance are found prevalingly in the more hilly portions of the state, the non-metallic principally in the foothills bordering the river valleys, and the metals chiefly in the more rugged and higher part of the mountain ranges. It is found that workable deposits of the metal-bearing ores are associated quite generally with igneous rocks, that is, either with rocks of volcanic origin, or the more crystalline rocks such as granites and granodiorites 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 the sedimentary beds, from rocks that have been deposited in water and have been later more or less consolidated.

Examination of the different sections into which the state is divided by its 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 that formerly existed along the crest of the range. The position of these vents or openings is represented today by the scores of craters and sharp peaks scattered throughout its entire length across the state. Mt. Hood, the highest of these, rises to an altitude of over 11,000 feet, while Mts. Jefferson, North, Middle and South Sister, Thielsen and McLoughlin, reach upwards of 9000 feet above sea level. From these old volcanic openings molten lavas flowed down both slopes of the range and showers of dust and ash were scattered over large stretches of contiguous country. Pre-existing sedimentary and other rocks were thus largely covered up, or broken through by the force of intrusions of the molten rock from below.

Along the west slopes of the Cascades, therefore, we find a variety of rocks, including ancient and recent lavas, volcanic tuffs and conglomerates, and shales, sandstones, etc. In places, masses of partly or wholly crystalline rocks appear that have been intruded into or have welled up beneath the overlying beds. It is in association with the last type of rocks that most of the ore

deposits are found. The east slopes of the Cascades and the adjacent country are more generally covered with surface lava flows through which the streams have only here and there cut sufficiently deep to expose these earlier rocks.

The Coast range of mountains is composed largely of beds of such rocks as shales, sandstones and quartzites, limestones and conglomerates. These are tipped up or folded and broken through by many dikes of basaltic lava and in places covered or interbedded with both ancient and the more recent lava flows. The Coast mountains have not been at all thoroughly prospected for ores of the metals, although coal, iron ore, stone, an abundance of useful clays are found, besides the scattered gold and platinum-bearing sands along the beaches and some of the streams that flow from their slopes into the Pacific ocean.

The principal mountain ranges of eastern Oregon are made up largely of igneous rocks of both recent volcanic and ancient deep-seated origin. Many of the prominent peaks have cappings of lava resting upon deeply eroded portions of an old granitic or granodioritic mass that has apparently pushed up from below. Others show outcroppings of sedimentary beds, sandstones, slates and marbles, that have been folded, or broken and tilted at various angles, and very greatly modified from 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 of the ranges seem to have been produced by up and down slipping 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 many others in eastern Oregon. Vigorous geologic disturbances of the kind mentioned, where they involve rocks of igneous types that originate at or extend to great depths in the earth, very frequently give rise to conditions that are favorable to mineralization and the formation of ore bodies. That such conditions formerly existed in our eastern Oregon mountain regions in a pronounced degree is proved by the occurrence there of the most extensive and richest bodies of workable ores of the common metals to be found anywhere in the state.

THE METALS

The total production of all metals in Oregon to date is estimated at 140 million dollars; 105 million from eastern Oregon and 35 million from the western part of the state. The production for 1915 was \$2,003,509 from 65 placer and 30 quartz mines. Metal output for 1916 estimated at \$4,000,000.

Western Oregon.—The state of Oregon contains several metal-bearing areas, widely scattered in different regions. More than half of its coast is fringed with a belt of auriferous sands which sometimes are rich in fine gold. 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 and copper belt of California. A third region in western Oregon is that on the western slope of the great Cascade range in the Bohemia, Blue River, Quartzville, North Santiam and Ogle Creek districts—from the Siskiyou on the south almost to the base of Mt. Hood near the Columbia river on the north.

The earliest discoveries of gold in Oregon were made in Jackson and Josephine counties, where placer gold was found as early as 1852. In the same year the Jacksonville district was organized, following the discovery of placer gold on a tributary of Jackson creek. That fall 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, a 15-mile ditch was paid

for with one year's production. In the two or three following years practically every part of southern Oregon was prospected and many productive districts were organized. After the most accessible gravel deposits were taken up and largely exhausted, placer miners turned to bench deposits and drift mining wherever such deposits could be worked by water under considerable pressure. Hydraulic mining was used in southern Oregon as early as 1856 and has been employed almost continuously ever since.

Soon after the discovery of gold-bearing gravels, quartz veins were located. In 1859 gold 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, besides causing prospectors to search for them rather than to develop ore. It is a region where many bonanzas have been found, but recently developments indicate that it also contains large bodies of lower grade ores of gold and copper.

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

The total production of all metals to date is estimated at 35 millions, about 5 of which came from the mines of the Cascade Range. The average production for the last 5 years is \$200,000, but the 1916 production of all metals will be more than twice that sum.

Eastern Oregon.—East of the Cascades (besides the most productive one, the Blue mountain region) are several widely scattered districts. Pueblo mountain district is in southern Harney county, and the Harney district in the northern part of the county, 125 miles away. The High Grade district of southern Lake county, 80 miles west of Pueblo mountain, is near the California line; the Howard district in northeastern Crook county, and the Ashwood district in the new county of Jefferson. Spanish Gulch is in southeastern Wheeler county. The above scattered districts have a record of but a small production.

The most important mining region in eastern Oregon, and in the entire state, is that of the Blue mountains, which is situated in the northeastern part of the state and extends westward for 130 miles from the Idaho line. This important region comprises 30 mining districts. Its total production to date is at least three-fourths that of the entire state.

The first gold discovery in eastern Oregon was at Griffin gulch, a few miles southeast of Baker, in the fall of 1861. In 1862 the large placer mines of Auburn, nearby, were discovered, and the following year Auburn camp had a population of 5000. By 1864 nearly all of the mining districts of eastern Oregon were known. Supplies were brought in from The Dalles, 300 miles away. Because of the difficulty of access and cost of transportation of supplies, gravels which did not yield \$8 per day for each man were not considered.

In 1863 the Auburn canal was completed. The next year the Rye valley ditch was constructed, and 9 years later Sparta ditch was completed, as was the Eldorado ditch, with its total length of over 100 miles, to supply water to the Malheur diggings. But by this time the principal hydraulic placer deposits were largely exhausted and a gradual decline in production began which has continued nearly to the present day. The introduction of standard gold dredges has caused an increase in placer production in the last two years, which is to be further increased by additional dredges.

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 were worked, but the shipment of ore on horse-

back for several hundred miles caused development to be slow. 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 just recovered from the injurious effects of this "boom," and since the greater number of producing properties are in good hands, we have a steady production from most of them, which is being increased by the addition of other producers to the list.

The production of the Blue mountain region previous to 1880 is very imperfectly known. Since that time the total annual production has been compiled by the federal government. Taking into account the best information obtainable, the total production of all metals for this area from 1861 to the end of 1916 is estimated at \$105,000,000. This estimate is based on that of Waldemar Lindgren up to 1899, to which has been added the production since that time.

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 in production, so that in 1915, the last year for which complete figures are available, the production from the 6 counties, for all metals, was \$1,859,033. Since the phenomenal production of the earlier placer days this amount has been approached but once when, in the year 1891, the gold and silver production was \$1,849,131.

Every one of the producing counties in this region enlarged their output in 1915, both placer and quartz mines increasing their production. It is estimated that the production for 1916 was almost twice that of 1915.

Copper.—Copper usually occurs in Oregon closely associated with gold and silver. Some of the more distinctly copper ores are found in the Homestead district on the Snake river, where it occurs as chalcocite and chalcopyrite in shear zones in greenstones. Another important area is the copper belt in the lower Powder river valley, where chalcopyrite, chalcocite and cuprite are found disseminated through the shattered and sheared greenstone.

Some good copper prospects are found in the Wallowa district, where they are mainly chalcopyrite in a contact deposit between granodiorite and limestone.

Another important district is the Waldo, some 20 miles southwest of Grants Pass. Here it occurs as chalcopyrite. The production from this district to date has amounted to approximately three million pounds, in spite of the long haul. The copper properties in this section will receive considerable impetus in their development on the completion of the California and Oregon Coast railroad, which is being built from Grants Pass to Crescent City, California.

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 to December 31, 1915, as given by the United States Geological Survey, is 3,768,469 pounds. The mine production for 1915 is reported to be 451,172 pounds, while the smelter production is reported as being 797,471 pounds. It is estimated that the smelter production of copper from Oregon ores in 1916 will exceed the total production for all previous years.

Other Metals.—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 eastern and western Oregon, especially in Lane and Baker counties.

The production of lead in 1915 was 62,957 pounds. This production came from six counties of the state, Lane county producing the greatest amount, although Baker also had a considerable production.

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, averaging only 98 ounces for each of the last six years, the high value of the metal makes the occurrence important.

Peridotite and serpentine derived from it are generally considered to be the native rocks of platinum and the abundance of serpentine in southwestern Oregon may account for the occurrence of it there, although platinum has not yet been found in place.

The production is secured chiefly from beach placer mines and associated with black sands.

Quicksilver is widely distributed in southwestern Oregon and traces of its ore, cinnabar, can be found in concentrates of nearly all of the placer mines. At a few points there has been extensive prospecting, but the total annual production of the state never exceeded a few hundred flasks. These deposits are irregular and though large are of low grade.

The first localities developed are northeast of Oakland. Developments are carried on farther north, especially on the Coast fork of the Willamette in Lane county, where a small production was attained within the last few years, though the mine has since been closed. More than 12,000 feet of workings have been opened up at the Black Butte mines, which has proved up an ore body from 7 to 20 feet wide and showing persistence both in length and depth. The cinnabar is also disseminated in small quantities through the country rock which, therefore, represents a very large deposit of low grade ore. The production for 1916 is estimated at 300 flasks.

A deposit of nickel ore in which the nickel is present as the green silicate, genthite, occurs a few miles west of Riddle on Nickel mountain. Peridotite partly changed to serpentine has resulted in the formation of a body of nickel ore sufficiently large to suggest the possibility of successful mining. The Oregon Nickel Mines Company has prospected it quite extensively, but as yet no attempt has been made to work it.

Molybdenum has been found in a few localities in the state, the most noted of which is in the contact deposits in the Wallowa district previously referred to under copper. The metal occurs as molybdenite, the sulphide of molybdenum, and is associated with such minerals as chalcopyrite, pyrite, magnetite, quartz, calcite, garnet and epidote.

Antimony is found in numerous sections of the state, usually in the form of stibnite, the sulphide of antimony. 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.

Stibnite is also found on Big Boulder creek four miles east from Susanville, in Grant county.

The most important property in the state is the Koehler mine, which see for details.

Chromite is ordinarily found in the vicinity of serpentine areas. Quite extensive areas of serpentine are found in the southwestern Oregon counties, also in Wheeler, Grant and Baker counties. In all of these localities chromite has been found, but the chief places of importance are those near Canyon City in Grant county, and in the Waldo district in Josephine county. The property near Canyon City is described under the heading, "Chromite Mines," and that in the Waldo district under the title, "Golconda Mine," to which the reader is referred.

COAL

Oregon is well supplied with coal, there being numerous fields located in various parts of the state, the most important of which is the Coos Bay field, in the southwestern part of the state, named from the fact that it entirely surrounds that body of water. The Coos Bay region is the only one that has recorded a steady production. This field has been operated continuously during the past 35 years and has produced about two and one-fourth million tons of coal. The production reached the maximum in 1904, when it amounted to 111,540 tons. The output in 1915 was 39,231 tons, valued at \$111,240.

The coal in this section is sub-bituminous and its average analysis is about as follows:

Moisture	9.5%
Volatile matter.....	43.5%
Fixed carbon.....	36.5%
Ash	7. %
Sulphur	1.2%

The production in this region has been materially reduced in the past few years on account of the cheap fuel oil from California.

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, being in quality 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 distant.

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

BAKER COUNTY

BAKER DISTRICT (Pocahontas, Auburn, Minersville)

The several districts which formerly had the name of Auburn, Pocahontas and Minersville have been in recent years described under the name of Baker. It is located upon the southeastern end of the Elkhorn range. The flanks of this range here are 4 to 5 miles wide and present narrow gradual sloping ridges separated by deeply incised gulches; on the east it sinks below Powder River valley, which is 3500 feet above the sea, while its western base is covered by the gravels of Sumpter valley, at an elevation of 4000 feet. The foot of the south end of the range is flooded by basaltic lavas up to 4500 feet and Powder river flows around the district in a semicircle.

The streams which drain this district are the several branches of Salmon creek, extending up into Hibbard, Rouen, Dutch and Washington gulches, which flow north into Powder river; Griffin and Elk creeks, which flow eastward; and Poker creek, flowing south into Powder river, drains French and Blue Canyon gulches in the old Auburn diggings.

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

Elevations in the district range from about 3500 at the Nelson placer up to approximately 5300 at the Auburn ditch (30 miles long), which was constructed in 1863 to furnish water for the various gulches.

The rocks are slate, argillite and some limestone, together with interbedded greenstone, some of which are old lava flows. That the main granodiorite

intrusion outcropping over wide areas farther north extends underneath this district is made evident by numerous dikes of granodiorite porphyry.

The first gold discovery in eastern Oregon was made at Griffin gulch in the fall of 1861. In 1862 the large placer mines of Auburn were discovered and the following year Auburn camp had a population of 5000.

The veins range from stringers to wide massive quartz veins. In Auburn the veins are small, in which occasionally rich pockets have been found. Most of the larger veins in other parts of the district have been too low grade to work. At the present time both placer and quartz production is practically negligible.

CABLE COVE DISTRICT

The county line between Baker and Grant counties follows the watershed which separates the Powder river drainage from that of the North fork of the John Day. The Cable Cove mining district is on both sides of this divide and therefore is in both Grant and Baker counties.

Cable Cove proper is on the Baker county side at the head of Silver creek, about 10 miles northwest from the railroad at Sumpter, and is reached by a good wagon road up Cracker and Silver creeks. Near Cable Cove the road emerges from the thick timber in the bottom of the valley and the head of the creek appears as a wide amphitheatre with steep slopes sparsely timbered. To the west the ridge of Bald mountain rises with bare light gray glaciated outcrops. Eastward a number of sharp and high granite peaks meet the eye as a continuation of the Elkhorn range. Looking north and west from the divide, wide glaciated mountain ridges and valleys are seen.

This district proper extends about 3 miles in the direction of the ridge and a mile or two down on each side of it. The elevation at the camp is about 7000 feet, while the higher points are about 700 feet above. Bald mountain, about 2 miles southwest from the camp, has an elevation of 8330 feet.

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

The geology of all of the veins is simple, since the country rock is entirely the intrusive granodiorite, and aside from aplite only a few dikes are seen. Glaciation caused these basins to have their present form. The veins are normal fissure veins, the result of an extensive system of parallel shearing planes. The vein matter consists largely of granodiorite crushed and chloritized, and close to the ore lenses in the more important veins, which are usually on the hanging wall side, the granodiorite is largely altered to sericite and kaolin. These high grade lenses are rarely more than a foot in width and consist of a small quantity of quartz and calcite gangue, the remainder being heavy sulphides. In a few places concentrating ore of lower grade is found up to a few feet in width alongside the higher grade lenses. The ore minerals are arsenopyrite, galena, chalcopyrite, pyrite and zinc blende, with gold and silver. The slopes of the divides are dotted with dumps and prospect holes upon the closely spaced parallel veins which cut across the district in a N. E.-S. W. direction.

Work was extremely active in this camp about 1900, a period of great activity in mining everywhere in eastern Oregon. Ore was discovered in the district in 1872, but not until 1885, when the transcontinental railroad was completed, did the district become active. One mill was erected previous to 1900, and others have been built since, but only a small mill was in operation in 1914.

The Imperial mine in 1915 and 1916 has been producing intermittently and the concentrating mill has been run occasionally.

CONNOR CREEK DISTRICT

Connor Creek district is a name applied to the territory along the Snake river between the mouth of Burnt river and the mouth of Powder river. In the central part of the district is Connor creek, which flows into Snake river about 14 miles north of Huntington. Connor creek, heading near Lookout mountain, is a small watercourse, a gulch rather than a creek. The grade is steep and its canyon deep and narrow, branching into 2 forks near Connor Creek mine, $2\frac{1}{2}$ miles up from the river.

The elevations are from 2000 to 4500 feet. The canyon slopes are covered with sagebrush; timber is found to the west of the district on Lookout mountain. The weather along the Snake river canyon is mild in winter and hot in summer.

The eastern border of the intrusive granitic rock of Lookout mountain is about 6 miles from Snake river. The intrusion failed to rise to as great elevations as in most of the regions elsewhere, consequently erosion has not yet removed the older rocks. In Connor Creek district it exists, nevertheless, at greater or less distances below the surface. The sediments and flows which make up the crust of the earth here were crumpled and folded at the same time as those in the adjoining regions. Accompanying and following closely upon this activity came the molten rock underneath it. Granodiorite porphyry and aplite dikes which are off-shots of the intrusion outcrop frequently. The country rocks are limestone and schist. No true bedding of the limestone was noted, but the schistosity strikes N. 70° E. and dips from 80° N. to vertical. The limestone is blue in color and has a finely crystalline texture. In some places it is brecciated and recemented with calcite. Where the pressure of the mountain building forces was strong enough the limestone has been changed into a limestone schist. The schist found in this locality is bluish and quite dense. In thin section it is seen to be very fine grained and to consist chiefly of elongated quartz grains with fine parallel bands of sericite. Most of the ore deposits in the district are simple quartz veins, but the recent development is upon gold disseminated in schist, a more particular description of which is found under Snake River Mines Company.

Upon the several small streams which flow into the Snake river there have been placer mines since early days. Those on Connor creek have been the most productive. It naturally has derived considerable coarse gold from the Connor creek vein. The whole creek below the mine has been worked over twice and parts of it are worked at the present time. The total production of the placer gold for this locality is about \$125,000.

CORNUCOPIA DISTRICT

The Cornucopia district is small in area. The mines and prospects are all within 4 miles of the town of Cornucopia, situated on the upper reaches of Pine creek, in the Wallowa range. It is 25 miles from the railroad town of Robinette, on the Snake river branch of the O.-W. R. & N., 33 miles north and down the river from the main line at Huntington. A good wagon road from Robinette to the camp leaves the Snake river at about 1,900 feet elevation at the mouth of Powder river which it also shortly leaves to mount on even grades to the divide between this stream and Pine creek at 3060 feet.

From here one drops by easy grades 400 feet into the delightful Pine valley and the thriving town of Halfway. A 2 per cent grade carries us up beyond Carson, where begins a steady 1,200-foot rise along Pine creek to our destination, 6 miles beyond. This part of the journey is through a fairly dense forest and within sight and sound of a good-sized mountain stream. This passage is from the hot sagebrush hills along the Snake, through a fertile agricultural valley dotted still with pines, into a region of deep canyons and precipitous slopes. Except in winter, regular auto, as well as the daily wagon mail stages,

take the traveler in by way of Robinette or directly in from Baker some 65 miles by road to the southwest.

From the time one leaves the watershed between Powder river and Pine creek, until well on his way from Carson to the camp, he passes over ordinary Columbia river basalt. One then begins to see greenstones and similar rocks, while in the steam beds boulders evidence the fact that Pine creek has its sources in granitic areas.

The town of Cornucopia is situated at the eastern limit of a granitic outcrop approximately 250 square miles in extent. Its outline is quite irregular. Its greatest dimension is southeast to northwest, a distance of about 30 miles.

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

The producing veins are all situated on "Granite" mountain two or three miles to the north and east of the town of Cornucopia, and at elevations of 1000 to 3000 feet above it.

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

This district has been a steady and profitable producer of gold and silver since the completion of a well-devised cyanide plant at the Union-Companion mine the first of March, 1913. The success of this company induced the Baker Mines company to build a somewhat similar plant to treat ore from the Last Chance vein, which began the operation of its 20 stamps and cyanide plant the latter part of October, 1914.

Gold was discovered about 1880. And soon afterwards production began in the intermittent way usual with new, isolated mountain mining camps.

According to Bernard MacDonald's report upon the property, the Union-Companion, Red Jacket and Last Chance claims produced \$1,008,000 previous to 1903. Estimating the years 1906, 1908 and 1916, and taking the official figures of Charles G. Yale, of the United States Geological Survey for the other years since 1903, the entire production to January 1, 1917, for the district is in excess of \$4,000,000. The production for 1916 is estimated to be more than \$750,000.

The deposits are normal white quartz veins in granodiorite, schist and greenstone. The principal values are in gold which, except near the surface, is but little amenable to amalgamation. Amalgamation and table concentration recovered but 65 per cent of the gross value, which is largely locked up in iron and other sulphides occurring in irregular bunches within the white quartz body of the vein. Fine grinding, 80 per cent through 200 mesh screen, and cyaniding recovers 90 per cent. The ores so far mined have a gross value well above \$10 per ton.

CRACKER CREEK DISTRICT (includes Ibex or Bald Mountain district)

The Cracker creek district is north of the Sumpter district and extends from the divide which separates Powder river drainage from that of the John Day to the north and east. It includes all of the drainage area of the Powder river north of the Sumpter district with the exception of the small area of the Cable Cove district in Baker county. Granite district joins it on the west and the Cable Cove, Rock creek (Elkhorn) districts on the north and east.

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

The lowest elevation in the district is about 5000 feet and all of the mining plants are located above that altitude. Timber is plentiful except in the higher altitudes. The maximum important elevations are from 5500 to 8000 feet. Deep snow prevails in winter but operations are nevertheless maintained throughout the year.

The district northeast to southwest is about 10 miles long, and most of it is in some variety of argillite, although occasional bodies of greenstone are seen. The argillite and the greenstone are the oldest rocks in the district. Practically all of the important veins outcrop in argillite but they are not far from the irregular southern border of granodiorite which extends indefinitely northward. This is the westward extension of the contact mentioned in the description of the Rock creek district, and also in the description of the Granite district to the west. The reader is referred to the description of the Ibex, Mammoth, Golconda, Columbia, E. and E., North Pole, Mountain View and Buckeye mines for more detailed information concerning the vein system of the district. The total production approximates \$9,000,000.

EAGLE CREEK DISTRICT (including Paradise (Paddy Creek), Copper Butte and Sanger Districts)

This district includes practically all of the drainage of Eagle creek, together with the territory south and west of Sanger which slopes towards lower Powder river and is drained by Balm and Goose creeks.

The elevation varies from 3500 feet on Lower Balm and Goose creeks to 8000 on East Eagle creek. Practically all of the district is covered with timber, only occasional small areas are barren.

Much of the area south of the Wallowa range and north of lower Powder river is covered by recent lava flows. Those areas not so covered are, with the exception of the small area of granite upon which the town of Sparta is located, made up of old sediments and old lavas and volcanics. The steep slopes and high ridges which form the upper drainage area of Eagle creek are made up of various sediments and old volcanic flows and breccias in considerable complexity. The lower foothills from near Sparta west to North Powder, where they are not covered by Columbia basalt, are seen to be made up almost entirely of greenstones.

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

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

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

granodiorite intrusion have been compressed and altered into dark green amphibolitic schist.

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

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

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

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

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

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

The third and at present important area extends from Medical Springs south and east some 20 miles. This greenstone belt makes up much of the middle drainage area of the various creeks which flow southward from the Wallowa range into Powder river, of which Goose and Balm creeks are the most important streams in relation to the prospects of this region. As examples of the two types of copper deposits found in this area, two prospects which are apparently the leading ones are described elsewhere under the name of "Gilkeson claims" and "Poorman group."

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

HOMESTEAD DISTRICT (Iron Dyke)

Four miles down the river from Pine creek and Copperfield is Homestead, the terminus of the Snake river branch of the O.-W. R. & N. Co.'s line, 58 miles north of Huntington. Five miles below Homestead the east and west county line between Baker and Wallowa counties cuts across the Homestead district. A wagon road extends 7 miles farther down the stream. A trail continues along the river 4 or 5 miles farther, and from there on the canyon is impassable. For 125 miles northward, as far as Asotin, a few miles above Lewiston, Snake river flows through one of the most remarkable canyons in the United States.

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

Basalt and the river and inaccessibility make this mining district's limits. This ragged edge of the older rocks elsewhere covered by the red blankets of recent flows, is for the most part made up of greenstones. This greenstone series, the oldest rocks of the district, consist of amygdaloidal, porphyritic

and dense flows with interbedded breccia, tuffs, sandstones, and conglomerates. The igneous flows make up by far the larger part of the series. Smaller streaks of sandstone and conglomerate are imbedded in the flows.

The general direction of the strike is N.-S., but the dip varies in both angle and direction. Microscopic examination of many thin sections reveals the fact that the original character of these rocks is much obscured by their pronounced alteration. This much is evident, that before their alteration the flows ranged from ordinary basalt to rhyolite, from basic to acidic flows, in which are roughly bedded masses of volcanic tuffs, breccias and occasionally thin beds of sandstone and conglomerate. These older rocks are old lavas erupted during the Triassic period. They are the same kind of rocks, of the same age and are the product of the same disturbances and rupturing of the earth's crust that caused the outpouring of the streams of molten lavas which are now the greenstones exposed at Cornucopia, at Joseph, on the southern slopes of the Wallowa range, and doubtless concealed under vastly greater areas by the great outpourings of recent basalt, the Columbia river lavas. The imbedded sandstones and conglomerates show that at intervals this region was submerged to receive for a short time a deposition of coarse and finer sediments, but the lifting out of the water or the coming of the next flow was too soon to permit anything but thin beds of these sediments to be laid down.

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

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

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

The shearing, fissuring, faulting, and brecciation of the greenstone gave ample opportunity for lateral and ascending waters to do their work of alteration and mineralization, the activity of which was much intensified by the after-effects of the deep-seated granodiorite intrusion. In some places the former and in others the latter type of solution appears to have been the chief factor in ore deposition.

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

Iron Dyke, may be due to a combination of lateral secretion and impregnation from sources below.

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

The discovery of and activity in this district has taken place within the last 20 years. Copper indications at the surface are evident to some degree almost everywhere in the exposed greenstones. Much of this territory is held by location, besides many claims are patented.

This district is opposite the Seven Devils district in Idaho, and the chief producing property is the Iron Dyke which is estimated to have produced in 1916, in excess of 3,000,000 pounds of copper.

MORMON BASIN DISTRICT (Including Rye Valley and Malheur Districts)

This district extends from Rye valley, Upper Dixie creek, westward to Malheur city. It thus takes in both slopes of the divide between upper Dixie creek and Willow creek. Since this divide is the county line between Baker and Malheur counties the district is in both counties. The Mormon Basin region proper is close to the divide. The Rainbow, the most important mine in the district, is in both Baker and Malheur counties. It is a true basin in shape with many small gulches draining towards the central part where they unite with Mormon Basin creek, which makes its exit through a small canyon in the southern rim. The elevation of the floor of the basin is about 4700 feet and it is probable that the maximum relief is about 1000 feet.

The steep sloping hills are covered with sagebrush and the higher elevations with sparse timber. There is a small precipitation. In winter the snowfall is not heavy enough to be of any great inconvenience. The railroad points are Durkee, 22 miles away, and Huntington, 25 miles distant.

The geologic history of this immediate vicinity is similar to many other regions of eastern Oregon, but with certain phases somewhat accentuated. The oldest rocks, which are also the predominant ones, are a series consisting chiefly of what were originally mudstones, sandstones, and siliceous and calcareous sediments. Interbedded with these may have been some lava flows or perhaps the basic igneous rock was intrusive into sediments in the form of sheets and sills.

This series was then subjected to severe mountain building forces which folded and faulted the rocks and altered the shales, sandstones, siliceous and calcareous rocks into slates, quartzites, cherts and marbleized limestones. By these same forces the basic igneous rocks were altered until they now consist of secondary hornblende, serpentine, and other green-colored minerals, so that they are now called greenstones.

Just at the close of this period of mountain building which contorted, fractured, and changed the series into rocks very much as they are at present, there came a granitic intrusion. The largest batholithic mass now exposed by erosion is that of Pedro mountain to the northeast. A stock of considerable size occurs west-southwest of the basin and can be seen along the road to the town of Malheur. Generally speaking the rock is a granodiorite of medium granular texture and consists of andesine feldspar with quartz, hornblende, and biotite and small amounts of magnetite. There are of course local variations in its composition due to magmatic differentiation. Increase of quartz bringing it nearer a granite, the decrease of quartz making it a quartz-diorite while the absence of quartz makes it a diorite.

Accompanying the intrusion in its closing phases were the characteristic dikes of porphyry and aplite. The first mentioned type are of peculiar interest in this region on account of the well known "spotted" dike of the

Rainbow mine. This particular rock is described under the description of that mine.

The heat of the intrusion as well as the emanations from it contributed further to the metamorphism of the overlying rock. During the cooling of the magma the region was under stress and the resulting fissures were filled with molten material which upon solidifying formed the dikes that have just been mentioned. Later when much of the magma had solidified the fissures which were formed at this time were filled with ascending silica solutions. These solutions deposited their quartz in the veins, and the precious metals and other minerals also. In this particular region movement took place during vein deposition as is shown by cemented vein breccia in many of the veins.

The mineralization of the veins in Mormon Basin varies. In some a large percentage of the gold is free; in others it is contained in sulphides which are chiefly arsenopyrite, and pyrite with minor amounts of sphalerite and galena.

After the veins were formed there was a period of erosion. Then came the outpourings of Tertiary lavas and the formation of lake beds during the same age. Both acid and basic lavas are to be found in this vicinity. The former which were probably earlier are represented by rhyolites and trachytes. In the Humbolt mine there is a dike of altered rock that was probably a feeder to one of these later flows.

Lake beds were formed in the lower part of the basin and probably have a thickness of a hundred feet or more. In places they are interbedded with altered trachytic flows. The lake beds vary in character from coarse gravel to clay. It is probable that the placers of today were at least partly formed by the reconcentration of gold bearing Tertiary gravel beds by present day streams.

The basic lavas are represented by basalt as in other parts of the eastern Oregon region. They are probably somewhat later than the lake beds. Basalt is found on many of the ridges.

Since the Tertiary series of lake beds and lava flows were laid down considerable movement has taken place, as is shown by the tilting and faulting of them.

Recent erosion has taken away much of the Tertiary covering. The present day placers have been formed by the wearing away of auriferous veins and the consequent deposition of the gold in the stream channels and also by the reconcentration of gold-bearing gravels of the lake bed formation.

This region is a particularly difficult one to prospect as is evident by the many abandoned tunnels. The cause of this difficulty is the close resemblance in places of the lake beds to the older altered rocks. Fragments of gold-bearing quartz in the coarser deposits of the lake beds entice the prospector to drive underneath ore at the surface which is not in place. The amount of wash or mantle rock is often such as to hide the true character of the bedrock. In some parts of the Basin faulting and shattering is particularly prevalent and here even when a true vein is found care must be taken to find it beyond the fault.

Willow creek is one of the largest tributaries of Snake river and enters it a short distance above Huntington. A bare ridge, 1000 to 2000 feet high separates Burnt river and Willow creek. On the slopes of this ridge and from 6 to 12 miles west of Rye valley are a number of well known old placer camps—Clarks creek and Bridgeport on Burnt river and Mormon basin, Amelia, Malheur and Eldorado on the Willow creek side. The operations have largely ceased in most of these camps.

The Rye valley placers were discovered shortly after 1862 and have been worked up to the present time with a total production of more than \$1,000,000. Water is available for only a few months in the year.

Dixie creek has been placered for 3 miles above the town but the high gravel bars have produced by far the most gold. Years ago it was proposed to dredge the stream bed but a depth of 90 feet has discouraged the attempt although borings are said to show an average value of 30 cents a yard.

A number of quartz veins have been found near Malheur but as yet none of them have become steady producers. The Red, White and Blue vein near Malheur has been developed by a shaft and has produced at times. It is said to be a vein 2 feet wide contained in a clay slate which is cut by diorite dikes.

A number of quartz veins containing silver have been found on Pedro mountain and attracted attention 40 years ago. The veins were rich in silver. But little has been done upon them in the last few years.

The production of the Mormon basin district from its placer mines is not known, although the amount is quite large. The production from quartz mines is confined almost to the last 9 years. The total production for the 9 years is approximately \$2,250,000.

ROCK CREEK (Elkhorn) DISTRICT

This district includes all of the drainage of Rock creek as well as that of upper Pine creek. It has formerly been considered as two districts, that of Rock creek and Elkhorn. The principal mine on Pine creek is the Baisley-Elkhorn, reached by wagon road up that creek. All the rest of the district is reached by wagon road from Haines up Rock creek.

The elevations range from about 5500 to 8500 feet and deep snows prevail in winter. The timber is plentiful on the middle elevations, but the higher points and ridges are practically bare.

The mines of both Rock creek and Pine creek are in close proximity to the contact between the granodiorite intrusion and the older rocks which are mostly argillite. This argillite is much altered due to contact metamorphism. Dikes of granodiorite porphyry and aplite cut the older rocks frequently. Near the contact the granodiorite intrusion shades off into diorite. Rock and Pine creeks and the many basins in their drainage areas show the profound effects of glaciation. The basin in which are the Highland and Maxwell mines is a hanging valley.

The veins of this district contain chiefly gold in an ore rich in sulphides. About one-fourth of the gold is amenable to amalgamation. Pyrite and zinc blende with some chalcopyrite are the principal minerals. The strike of the vein system is north-east to south-west.

SPARTA DISTRICT

The Sparta mining district is located in T. 8 S., R. 44 E. Sparta, the only post office in the district, is 30 miles from Baker on the main wagon road to Richland, the chief town in Eagle valley. This township is between lower Eagle creek and Powder river, and with the exception of its northern border is a granitic area surrounded by recent basalts. Doubtless it was once entirely covered by the Columbia river basalt since Sparta butte, close to the town of Sparta, is an uneroded remnant of basalt. The Sparta region, no larger than 30 square miles, is a granitic stock which was intruded into the older greenstones and sediments. These older greenstones and sediments which covered this granitic stock at the time were eroded from its top. Afterwards when the great flows of Columbia river basalt spread over wide expanses in eastern Oregon they covered the Sparta region also, and erosion, with the exception of the northern border, has not fully uncovered all of the intrusion which had been uncovered previous to the first flow of this late basalt.

This intrusion is a light-colored rock of very coarse-grained texture, and consists chiefly of feldspar and quartz. The rock, in thin section, is seen

to be composed chiefly of albite feldspar, which sometimes shows zonal growth with the central portion of the feldspar crystals more basic than the outerparts. This rock is a soda granite and the much larger quartz grains and the more basic portions of the feldspars suggest that it is a more acidic phase of the intrusion which elsewhere in eastern Oregon is almost altogether the more basic granodiorite. Besides the granite there are outcrops of porphyry in the vicinity.

In the granitic area adjacent to Sparta we have normal fissure veins formed by the deposition of quartz coming from the cooling mass below. The same type of vein is found cutting the greenstones, but the more distant they are from the intrusive the less extensive is their mineralization.

Lindgren states:

A long, heavily timbered ridge follows the western side of Eagle creek for a long distance toward Powder river. The Sparta mining district occupies the southern end of this ridge, where the rounded hills, here scantily forested, gently slope toward the arid foothills of Powder river. The elevation of Sparta is 4200 feet. The normal granite which forms the country rock is deeply decomposed and the gulches are filled with gravel. It was found at an early date that these gulches, draining in all directions from the central hill, were auriferous, but on account of lack of water little could be done until in 1873, the Sparta ditch was completed, with a capacity of 3000 miner's inches and a length of 22 miles. This canal takes its water from the west fork of Eagle creek and carries it down on the long ridge to Sparta. Great activity followed its completion, but in a few years the output rapidly diminished. According to the mint reports the placers produced \$35,000 in 1882, \$30,000 in 1889, \$4,500 in 1890, \$3,100 in 1891, \$85,000 in 1892.

The gulch placers of Sparta in most cases led up to well-defined quartz veins. Many of these were known in early days and gold was extracted by hand mortars, arrastres, and small mills. These operations were not continued, however, and the production from the veins gradually fell off; from \$60,000 for Union county in 1880, the output was reduced to \$7,300 in 1885, \$15,000 in 1886, and \$15,000 in 1887; but in 1889 there was a most remarkable change, the output in that year rising to \$576,000. Most of this, of course, came from the Sanger mine (Eagle district) and the Cornucopia (district), but a large proportion was contributed by the quartz mines of Sparta. For the four years (1889-1892) from which complete returns are available, the following productions are compiled:

Little Pittsburg	\$111,000
Windsor	72,000
Union Tunnel Company.....	91,000
Gold Ridge Company.....	124,000
Free Thinker	65,000
Arkansas Belle	83,000
Magpie	19,500
New Gem	59,000
Del Monte	27,500
Buffalo	25,000

As the workings deepened the country rock became harder and the general conditions more unfavorable, so that of late years the production has again been declining, and in 1900 only one mine, the Gem, was worked on a larger scale. Though the veins are narrow they are rich, and it is more than probable that thorough prospecting will develop many good mines in the vicinity. The prevalent strike of the veins is north-south or northeast-south-west; the dip is to the east or southeast. The country rock is throughout a granite, in which the biotite is usually converted to chlorite. The ore is free-milling quartz, with some sulphurets.

There is very little activity in mining in this district at the present time. Some work is being done at the Gem mine. A small amount of placer mining is also carried on. The surface of the granite is badly weathered and the shafts and various tunnels and open cuts have nearly all caved in so that there is little to be observed.

SUMPTER DISTRICT

The Sumpter district includes the Powder river drainage from an east-west line about 3 miles north of Sumpter, down to and including Deer creek which flows into the Powder river about 9 miles below Sumpter. It

thus takes in practically all of Sumpter valley. A short distance below the mouth of Deer creek the Powder river enters a narrow canyon in which it flows for about 12 miles. The Sumpter valley, which is above the canyon, is at an elevation of from 4000 to 4500 feet and is an alluvial bottom flanked by broad gently sloping forested benches. Beyond these the snowy summits of the Elkhorn range rise abruptly eastward, while to the west a well-timbered ridge of moderate elevation separates the valley from Burnt river drainage. A little above Sumpter the Powder river ceases and is made up of branches of Cracker creek, McCully fork and several other smaller creeks, all heading among the high ridges leading to Elkhorn range or Mt. Baldy.

Argillites in great variety outcrop over most of this area. Although the main branches of the streams rise in granodiorite areas, the only outcrops of granodiorite within the district are of small extent: one on the divide between Sumpter and Granite, about half of which is in Baker county, a very small outcrop at the head of Lake creek, a branch of Deer creek, and several small irregular outcrops on the divide between Powder river and Burnt river on the south side of Sumpter valley below the town. Some small outcrops of limestone as well as occasional bodies of greenstone are found within the argillite areas, and granodiorite porphyry and aplite dikes occur in the vicinity of the granodiorite, since the latter is an intrusive into the argillite.

The general course of Powder river was evidently laid out before the outpouring of the basalt which covers much of the territory to the south of the district. It is evident that these basaltic flows dammed the river to a height of 4600 to 4700 feet and that this barrier created Sumpter valley. Coarse gravels at once began to accumulate filling the valley to an elevation of 4600 feet; and these ancient gravels can now be seen on the older rocks for a maximum width of nearly 6 miles and a length of about 15 miles. As the lava barrier was gradually cut through the gravels were left in terraces in the valley. At the present time the stream has cut down 700 feet below the top of the lava flows.

There is a small area of lava still remaining upon the divide between Buck gulch and Burnt river valley. Underneath this lava flow is a buried stream channel. This buried 3-mile remnant of a former drainage system apparently forked a short distance above Sumpter. The destruction of most of this stream probably contributed more gold to the placer mines than the erosion of veins by the present drainage system.

Workable placer grounds do not extend very far up Cracker creek from Sumpter since most of the area to the north formerly had glaciers in it. To the west there was much placer mining in former days, particularly at the Weaver mine and on benches above and below the town of Sumpter. The greatest area of course is below the town where on the valley floor the dredges are working a field 300 to 2000 feet wide and 5 miles long. Several of the smaller creeks which empty into Deer creek contain placer gold.

About the only active quartz mine is that of the Golden Chariot Mining Company, elsewhere described.

VIRTUE DISTRICT

The Virtue district, one of the oldest in Eastern Oregon, is situated about 7 miles directly east of Baker and is about 12 miles in length from north to south and varies in width from 3 to 6 miles. It occupies the southern part of T. 8 S., practically all of T. 9 S., and the northern part of T. 10 S., all in R. 41 E.

It covers a region of low arid hills rising in the great bend of Powder river. The elevation ranges from 3400 to 5000 feet. The hills rise rather

abruptly from Baker valley and slope gently eastward toward the lower Powder river valley. Most of the drainage is toward the latter. Within these hills is Virtue flat, a sage-covered depression extending 8 miles east and west and 2 miles north and south. The water supply is very scant, the only stream being Ruckle creek in the extreme eastern part of the district. Good wagon roads from Baker City reach every part of the district.

The geology is similar in the main essentials to that of the other mining sections of eastern Oregon, in that the ore deposits are the result of an intrusion into older flows and sediments. Obscured as it is by the covering of hillside wash, basalt, and lake beds laid down since the time of the intrusion and only partially removed, makes field investigation difficult.

The intrusion exposed over but a limited area in the northern part of the district is a greenish-gray diorite, grading into gabbro. This diorite is probably a local development of a granodiorite intrusion. By this we mean that the intrusion in stopping its way into the older greenstones and argillites has incorporated so much of these older rocks that its acidic nature has been so modified on this upper part as to become sufficiently basic to be called a diorite. Erosion has exposed nothing but the diorite, but there are many things which evidence that underneath this modified exterior it will shade into granodiorite at depth.

The argillites and greenstones into which the intrusion came have been much mashed and altered by regional metamorphism, doubtless both before and during the time of the intrusion. Of the older rocks greenstones predominate in the northern part of the district, while argillites are the chief older rocks in the southern part. They doubtless continue underneath their basalt covering many miles to the south and west. Thin basalt flows are found on the tops of the elevations and on much of the hillsides. In Virtue Flat lake bed materials to considerable depths exist.

At different times during this period the intrusion was fractured and its roof of sediments and flows as well. Into these fractures was injected the dikes which grade from basic to acidic, the latter from granodiorite-porphyry to aplite. After the dikes had been formed, later fractures were filled with gold-bearing quartz deposited in them by hot ascending waters coming from the intrusion itself. Since the intrusion apparently is a stock or roughly circular, it is to be expected that there would be no parallel vein system. The quartz veins strike in many directions and individual veins are not traceable for long distances. Most of the deposits are normal, simple, quartz veins containing very small amounts of sulphides and the free gold is coarse and contains but little silver. Very rich pockets were frequently found. The total production of the district is about two and one-half millions.

WEATHERBY (Gold Hill) DISTRICT

The Weatherby district includes the drainage of Burnt river from Durkee station south to the Snake river, with the exception of upper Dixie creek, where the old Rye Valley district, now grouped with the Mormon Basin district, is located. Burnt river emerges into an open valley near Durkee, turning at the same time to a southeasterly direction, which it maintains until near its junction with the Snake. A few miles below Durkee a canyon again begins and continues down to Huntington, with a depth of from 2000 to 2500 feet. Above Weatherby a number of smaller tributaries join the river, all heading up toward Lookout mountain (elevation 6900 feet), the highest point in the divide between Burnt and Powder rivers and a well known landmark visible from all directions. The elevation of the river at Durkee is about 2650 feet, descending to 2117 at Huntington. The grass-covered slopes rise steeply from the narrow flats along the river, and are forested only along the highest portions of the Lookout ridge. During the rainy season Burnt

river carries a considerable amount of water, but so much is taken out in ditches for mining and agricultural purposes that it is almost dry at times during August and September near Huntington. Dixie creek, heading some 12 miles westward on Pedro mountain, is the only tributary of note entering Burnt river from the western side.

Burnt river canyon, in the region here described, is cut in older rocks—slates, limestones and diorites. The great sedimentary series is, as far as can be seen, conformable with the Huntington and Snake river series. It consists almost exclusively of fissile clay-slates and strata or lenses of gray limestone. It is only toward Unity and Pleasant Valley that greenstones and greenstone tuffs appear, probably as formerly intercalated flows. The strike is very constantly N. 70 to 80° E., and the dip usually at very steep angles toward the north. The most prominent stratum of limestone crosses Cave creek south of Burnt river canyon, and continues with well marked croppings several hundred feet wide to the foothills of Durkee valley. The age of this series is not known, no fossils of any kind having been found in the limestone masses or in the slates. Occasionally greenstone-schists are interbedded with the clay-slates.

Large masses of granitic rocks are intruded into this sedimentary series on a line from Lookout mountain to Malheur, a line also followed by the gold deposits. The most easterly of these masses occupies Lookout mountain and the summit of the ridge. A smaller area of granodiorite begins on Gold Hill, a few miles southeast of Durkee, and probably continues down as far as Sisley creek. The third and largest area contains quartz-diorite and diorite along the margins, but granodiorite and possibly also granite in the center. This is the area of Pedro mountain on the west side of Burnt river, extended for about 10 miles southwest and northeast, with a maximum breadth of 6 miles. The intrusive character of these rocks is proved by dikes of similar material in the slates and by contact metamorphism of the latter. As far as observed, these granitic rocks show no schistosity.

The Neocene formations are developed extensively only in Durkee valley and in the foothills 5 or 6 miles north and northeast of the railroad station.

Auriferous veins and placers accompany the series of intrusive granitic rocks from Lookout mountain to Malheur. In contrast to the strongly developed vein system of the Sumpter region, these veins are not very persistent. They cannot be traced for long distances, nor are strike and dip constant. On the whole, this belt is more noted for its placers than for veins, from which fact it might be inferred that the gold is scattered in many small fissures rather than concentrated in prominent vein systems.

Several prospects are located north of Lookout mountain, but has not as yet attained prominence. On Chicken creek, near Weatherby, are several veins which have been worked in a small way for many years. Practically all of the streams which flow into Burnt river are gold-bearing and have been worked since the early days. A few placers are now worked each year. The most celebrated are the diggings of Sisley and Chicken creeks. The gravel bed of Burnt river is gold-bearing and low bars have been worked with considerable success below Durkee.

Between Durkee and the mouth of the lower canyon good dredging ground is thought to exist. At Weatherby the canyon widens to 700 feet. A dredge was operated for a short time about 20 years ago, but it ceased operations because it was not heavy enough to do the work.

CLACKAMAS COUNTY OGLE CREEK DISTRICT

The Ogle Creek district lies on the western slope of the Cascade range in the southeastern part of Clackamas county, and occupies the area drained by Ogle creek, one of the headwater branches of the Molalla river.

The region is reached by a poor wagon road from Silverton, on a branch of the Southern Pacific railroad, some 35 miles west. The district can be more easily reached from Gates by wagon road 12 miles to Elkhorn postoffice, and then by trail 5 miles over the divide between the Little North fork of the Santiam and the Molalla.

It is a region of rugged topography, varying in altitude about 2000 feet, the higher points having an elevation of about 3500 feet. The annual precipitation of the district is about 50 inches, a large part of which falls in the winter months as snow, and stays on the ground for several weeks. The hills are heavily forested, due to the mild, humid climate, and the region lies within the Oregon National forest.

The rocks of the district are almost entirely Cascades andesitic lavas, which make up a large part of the Cascade range. The ore deposits are in silicified and mineralized fracture zones cutting through the andesites, varying from 1 to 8 or 10 feet in width. The most important ore minerals are pyrite, chalcopyrite, sphalerite and galenite. Near the surface these vein minerals are oxidized and are found as free gold in iron-stained vein material. Some beautiful specimens of wire gold have been procured from veins in this district. The best developed mine of this area is the Ogle Mountain, which has been on the producing list at different times during the past ten or fifteen years.

COOS COUNTY COOS BAY DISTRICT

The Coos Bay district is located in the west central part of Coos county, and is the most important productive coal field in the state. The coal field, as described in the publications of the United States Geological Survey, is in general elliptical in outline, 30 miles in length north and south, and 12 miles in greatest breadth, having an area of approximately 250 square miles, included in townships 24 to 29 south, ranges 12 to 14 west. The south end of the coal field is drained by the Coquille river, while the larger part of the area in the north end of the district is drained by the Coos river and its tributaries.

The altitude varies from 500 to 800 feet above sea level. The climate of the district is mild, the rainfall being rather heavy, averaging 65 to 70 inches annually. The precipitation is largely in the winter months and is confined almost entirely to rain.

The principal towns of the district are Marshfield and North Bend, both located on Coos Bay. Other towns are Coquille, Myrtle Point, Riverton, Beaver Hill and Bandon.

The district is well supplied with transportation, Coos Bay furnishing good harbor facilities for coastwise shipping trade. Early in 1916 the Southern Pacific railway completed its line to North Bend and Marshfield, connecting with the main line at Eugene. This furnishes the first railway communication with points outside of the county which this district has enjoyed.

The rocks of the district are largely sandstones and shales, closely associated with the coal beds. In the hills farther to the east are found numerous flows and intrusives of basalt. Mining in the district is confined largely to coal, which occurs in beds 3 to 5 feet thick. The sedimentary rocks in which the coal beds are found have been gently folded and for this reason the coal beds are found at times outcropping on the surface and again many hundreds of feet below the surface, having a usual dip of from 20 to 40 degrees. The quality of the coal in this section is fairly long flaming, having 10 to 15 per cent of ash, and has been determined by the United States Geological Survey as sub-bituminous.

ROCK CREEK DISTRICT

Rock Creek district is in the extreme southern portion of Coos county, being contiguous to the Ophir district of Curry county, and occupies the area drained by Rock creek, a tributary of Coquille river. The elevation varies from 1200 to 3000 feet. The climate is mild. There is a rather heavy rainfall, and considerable snow in the winter months.

The region is heavily forested and is within the Siskiyou National forest. Excellent forest maps covering this area and showing trails, general drainage and other useful information can be had by applying to the forest supervisor, Grants Pass, Oregon, or to United States Forest Service, Portland, Oregon. This region is also covered by the topographic sheet of the Port Orford quadrangle, published by the United States Geological Survey, and same can be had by applying to the Superintendent of Public Documents, Washington, D. C.

There are no wagon roads in the district. It can be reached by trail from the Rogue river at Agness or from the end of the Smith-Powers logging road from the north. According to Diller, the predominating rocks are sandstones and shales with some basic igneous rocks, probably intrusive into the sedimentaries, and which have been altered in numerous places to serpentine.

There has been considerable interest for a number of years in quartz and placer mining in this section, as well as farther to the north in the Salmon mountain country. Good prospects for gold, as well as copper and chromic iron ore, have been reported from this section.

**CURRY COUNTY
AGNESS DISTRICT**

The Agness district is in the east central part of Curry county in the vicinity of the town of Agness, which is situated on the Rogue river, about 20 miles from the coast. The district occupies an area drained by the Rogue river, being bounded on the west by the divide between Rogue river and Lobster creek, on the north by the Coos-Curry county line, on the east by Mule creek district, and on the south by Collier creek district.

The elevation of the district varies from about 120 feet at Agness to more than 3500 feet in some of the higher points in the district. The climate is mild, the usual summer temperatures being between 60 and 70 degrees. The temperatures in the winter are usually above freezing, but in the higher altitudes being sometimes below zero. The annual rainfall is above 65 inches. In the lower altitudes the snow rarely stays on the ground long, but in the higher altitudes it may accumulate for a few weeks.

The district is heavily forested, being within the Siskiyou National forest. Excellent forest maps covering this property and showing trails, the general drainage, and other useful information, can be had by applying to the Forest Supervisor, Grants Pass, Oregon, or to the United States Forest Service, Portland, Oregon. The district is also partly covered by the topographic sheet, Port Orford Quadrangle, published by the U. S. Geological Survey, and same can be had upon application to the Superintendent of Public Documents, Washington, D. C.

The only means of transportation to the district is by trails, there being a good trail on either side of the Rogue river from Gold Beach to Agness.

The rocks are predominantly sandstones, shales and conglomerates, except in the southwestern portion, where considerable quantities of mica schist are found, together with some basalts. Locally other basic intrusives and serpentines are also found.

CHEWCO (Mt. Emily) DISTRICT

The Mt. Emily district is situated in the southwest corner of Curry county, Mt. Emily being the most important topographic feature of the district, and

occupies the area in the neighborhood of the mountain, drained by the tributaries of Chetco river and Wheeler creek.

The elevation varies from less than 100 feet at the river to nearly 3000 feet at the summit of Mt. Emily.

The climate is mild, the usual summer temperatures being between 60 and 70 degrees. The temperatures in the winter are usually above freezing, but in the higher altitudes being sometimes considerably below freezing temperatures. The annual rainfall is 60 to 70 inches. In the lower altitudes the snow rarely stays on the ground long, but in the higher altitudes it may accumulate for a few weeks.

Brookings and Harbor, 6 miles to the southwest, at the mouth of Chetco river, are the nearest towns. The district is heavily forested, being within the Siskiyou National forest. Excellent forest maps and showing trails, the general drainage and other useful information can be had by applying to the Forest Supervisor, Grants Pass, Oregon, or to the United States Forest Service, Portland, Oregon.

Sedimentary rocks in this district are predominantly shales, slates and fine grained sandstones, into which rhyolites have been intruded in the neighborhood of Mt. Emily. In certain areas around the mountain, a rock which seemed to be syenite porphyry was noticed, which is probably closely related to the intrusion, and in other places dikes of basalt are found. There is considerable evidence of mineralization around this rhyolite intrusion, a number of comparatively rare minerals being found, such as molybdenite, cobalt and nickel minerals.

CHINA DIGGINGS DISTRICT

The China Diggings district is located in the southeast part of Curry county. It occupies the headwaters of the Chetco river in the neighborhood of Gold Basin butte, Red mountain and Whetstone butte, the eastern boundary of the district being the Curry-Josephine county line.

The district has a mild climate, the usual daytime temperature in the summer being from 60 to 80 degrees, while in the winter it rarely gets colder than 10 degrees above zero. The rainfall is between 65 and 70 inches annually. In the lower altitudes snow rarely stays long on the ground, while in the highest altitudes, 3 or 4 feet may remain for several weeks. The altitude varies from 1500 to 2000 feet, the highest elevation being 4000 feet.

The area is well forested, being within the Siskiyou National forest. Excellent forest maps covering this property and showing trails, the general drainage and other useful information, can be had by applying to the Forest Supervisor, Grants Pass, Oregon, or to the United States Forest Service, Portland, Oregon.

Transportation is entirely confined to trails, being most readily accessible from Illinois river in Josephine county.

The rocks in this district comprise several varieties of greenstone and a great deal of serpentine, outcropping in several bands with a general north-south trend. Gold ores in this area are usually found in the greenstone in the neighborhood of the serpentine contacts.

COLLIER CREEK DISTRICT

Collier Creek district is situated in the east central portion of Curry county and includes the area drained by Collier, Lawson and Horsesign creeks, its eastern boundary being Josephine county. The elevation varies some 2000 feet in the district, the highest elevation being above 4000 feet.

The climate is mild, the usual day time temperature being from 60 to 85 degrees, and in the winter varies from freezing temperatures to 10 degrees above zero. The total rainfall of the district is about 40 inches. The snowfall is small in the lower altitudes, while in the higher altitudes it attains at times a depth of 3 or 4 feet for several weeks.

Transportation is entirely confined to trails. The district can be reached by way of Agness from the north or by trail down the Illinois river from Kerby and Waldo in Josephine county.

The region is well forested and is within the Siskiyou National forest. Excellent forest maps covering this property and showing trails, the general drainage, and other useful information, can be had by applying to the Forest Supervisor, Grants Pass, Oregon, or the United States Forest Service, Portland, Oregon.

There is a great variety of rocks found in this district, the most important being argillites, slates and sandstones, known as the "Myrtle formation," which occurs mostly in the lower drainage area of Lawson and Horsesign creeks. In the upper headwaters of Lawson creek are found considerable areas of mica schists, known as the "Colebrook formation," while in the headwaters of Collier creek are found other sandstones and shales which go by the name of "Dothan formation." In the neighborhood of Horsesign butte and the headwaters of Horsesign creek are found a series of basic igneous rocks and the alteration products such as serpentine. Most of the ore deposits are in or near serpentine, many of them having a close association with intrusive igneous dikes, which are found to be dacite porphyry. The deposits in the serpentine are lens-shaped masses of varying sizes similar to those found in the Waldo district in the Queen of Bronze and Waldo mines. A considerable amount of development work has been done in this area, some massive copper ores having been packed out in earlier days.

ELK RIVER DISTRICT

Elk River district is in the northern part of Curry county, and occupies the area drained by the Elk river, being immediately south of the Sixes River district. The elevation varies from slightly above sea level at the river to approximately 2500 feet at the highest points in the district.

The annual rainfall is heavy, being usually above 65 inches. Snow rarely stays on the ground long in the district. There are no wagon roads except those at the mouth of the river near the coast, and trails are the only means of communication. The district is well forested and lies within the Siskiyou National forest. Excellent forest maps covering this property and showing trails, the general drainage, and other useful information, can be had by applying to the Forest Supervisor, Grants Pass, Oregon, or the United States Forest Service, Portland, Oregon. The district is also covered by the Port Orford topographic sheet published by the United States Geological Survey. Copies of the same may be had upon application to the Superintendent of Public Documents, Washington, D. C.

Both placer and quartz prospects are found in the district. Men who have prospects in gravels along the river claim that rich bars exist at several points. The rocks are predominantly sandstones, shales and conglomerates in what is known as the "Myrtle formation." Most of the mining activity is, however, in an area of altered andesites and other porphyries known locally as greenstones. This area occurs at the mouth of Bald Mountain creek and for a few miles above.

GOLD BEACH DISTRICT

The Gold Beach district is located near the mouth of the Rogue river and occupies the old beaches both north and south of Gold Beach for a distance of 5 or 6 miles.

The elevation of the district is only slightly above sea level, the climate therefore being extremely mild. The annual rainfall of this section is about 65 to 70 inches. Snow rarely stays long on the ground in this section.

The principal towns are Gold Beach and Wedderburn, one on each side

of the Rogue river at its mouth. Transportation in the district is confined to small coastwise vessels, which occasionally stop at Gold Beach and Wedderburn. A fair wagon road connects with points north and south along the coast.

The rocks of the district are entirely sandstones, shales and conglomerates close to the coast line, while the older contiguous rocks further inland are mostly of the basic igneous type and serpentine. Mining is confined largely to the placer deposits of the present beach lines and older elevated beaches near the coast. The sands making up these old beach deposits are in many places largely black sands, the black minerals being magnetite, ilmenite and chromite, all of which are very resistant to weathering and which have come from the weathering and erosion of rocks distributed over the wide drainage area of the Rogue and other rivers. Considerable values in platinum and gold are found in different places in these black sands, which have been mined in a small way with varying success in different parts of this district, as well as at other points on the Coos and Curry coast.

MULE CREEK DISTRICT

Mule Creek district is located in the extreme east central portion of Curry county, and occupies the area drained by Mule creek and its tributaries, which flow into the Rogue river at a point about 40 miles above its mouth. The district is bounded on the north by Coos and Douglas counties, on the south-east by Josephine county, and on the southwest by the Rogue river.

The elevation varies from a few hundred feet at Rogue river to more than 3500 feet at the highest points. The climate is mild, the daytime temperatures in the summer varying from 60 to 80 degrees, and in the winter from above freezing to 10 degrees above zero. The annual rainfall is about 50 inches. In the lower altitudes snow rarely accumulates to any great depth in the winter, while in the higher altitudes it may reach 3 or 4 feet and stay on for a few weeks.

There are no wagon roads, transportation being confined entirely to trails. The district can be reached by good trails up the Rogue river from Agness or by trail down the Rogue river from the Galice district in Josephine county.

In the district are found sandstones, shales and conglomerates, characteristic of a large area along the Rogue river, more especially in the southeastern portion, while in the northern portion in the neighborhood of Diamond and Saddle peaks and Mt. Boliver, are found large areas of greenstone, which are altered porphyries, such as andesite. Serpentine areas are found in numerous places near the contact between the greenstone and the sediments. The ore minerals of the district are largely copper and iron sulphides carrying values in gold and silver.

OPHIR DISTRICT

The Ophir district is located in the north central portion of Curry county and occupies the area drained by Boulder creek, which has its headwaters at Ophir mountain on the Coos-Curry boundary line.

There are no wagon roads in the district, being reached by trail either from the mouth of Rogue river or from Agness, about 10 miles southeast.

The rocks are largely sandstones, shales and conglomerates, into which have been intruded basic igneous rocks, sometimes altered to serpentine. Considerable areas of greenstone are found in the district. In past years there has been considerable prospecting both in placer and quartz mining.

PORT ORFORD DISTRICT

The Port Orford district is located in the northwestern portion of Curry county near the coast, including the area in the vicinity of Port Orford.

Transportation is confined to small coastwise vessels, which stop at Port

Orford, and to wagon road which runs north and south near the coast line. This road connects with Denmark, Bandon and Marshfield to the north.

The mining in this district is entirely beach placers, from which gold and platinum are recovered with variable success. Considerable progress is being made in this kind of placer mining in numerous places along the coast of Coos and Curry counties, and it is hoped that a satisfactory solution for the recovery of these metals may soon be worked out on a large scale.

SIXES RIVER DISTRICT

Sixes River district is located in the northern part of Curry county and occupies the area drained by the Sixes river. The elevation of the district varies from sea level at the mouth of the river to about 3000 feet at the highest points.

The climate is mild. The annual rainfall is from 65 to 70 inches. Snow rarely stays long on the ground in the lower altitudes, while in the higher parts it may accumulate to a depth of 3 or 4 feet for a few weeks.

The wagon roads are confined to areas contiguous to the coast. Trails are the only means of transportation in the main part of the district. The coast wagon road connects with points farther north in Coos county, such as Bandon and Marshfield.

The rocks are predominantly shales, sandstones and conglomerates of the Dothan and Myrtle formations, but are often intruded with basic igneous rocks, which are altered in numerous places to serpentine. A considerable area of greenstone is found in the headwaters of the Sixes river near Rusty butte and Salmon mountain. A considerable area of basalt is found in the north central part of the district. There has been more mining activity in this district than in any part of Curry county. Placer mining has been carried on more or less for more than 30 years, and in later years leading to considerable activity in quartz mining.

CROOK COUNTY

BEAR CREEK BUTTE DISTRICT

The Bear Creek Butte district is in Crook county, 30 miles southeast of Redmond, a railway station near the Deschutes river. This district is about 20 miles south of the Howard mining district and is south of Crooked river, on the headwaters of Bear creek, which eventually flows into Crooked river at Prineville.

It is reported that fair values in gold and silver are found in wide deposits in porphyry. This district has not been visited, but it is thought that this porphyry may be andesite similar to that in the Howard and Trout creek districts farther north. In the spring of 1916 there was renewed interest in this district.

OCHOCO (Howard-Bollivar) DISTRICT

This district, located on Ochoco creek, is in the northern part of Crook county about 30 miles northeast of Prineville and about 45 miles from the railroad at Redmond, although it is expected that a local line will connect Prineville with the main line in a short time.

The district is well watered and well timbered. The country rock is practically all some variety of andesite and the important mineralization is in wide brecciated zones in this rock.

A small production of placer gold is made each year. The chief mine of interest is the Ophir Mayflower, elsewhere described. The distance of this district from the railroad and the baseness of the ore have had much to do with the failure to successfully operate the properties.

REDMOND DISTRICT

During the latter part of 1914 and in 1915 there was much interest taken in the black sand area of the Deschutes and Crooked rivers in Crook county. A great many claims were staked by various persons and one or more experimental mills erected to test out these deposits. Much publicity was given to the matter in 1915, but not much activity was reported in 1916.

The sands are associated with thick beds of light colored volcanic tuffs and some gravel. The area on Crooked river and the Deschutes river is apparently an old lake bed deposit, of unknown extent, which was entirely covered by lava flows since the lake beds were formed. The basic lavas may be seen overlying the tuff and sands for many miles in the canyon of the Deschutes river.

DOUGLAS COUNTY**DREW CREEK DISTRICT**

Drew Creek district is situated in the southern part of Douglas county in the headwaters of the south Umpqua river, and includes the area drained by Drew creek, the most important mines being 4 to 6 miles south of Drew postoffice. The district can be reached by wagon road from Canyonville, up the south fork of the Umpqua, a distance of 25 miles, or from Gold Hill or Medford by way of Trail and Trail creek.

The elevation of the district varies from about 1500 to 3000 feet. The climate is mild. The annual rainfall is about 30 inches. Three or four feet of snow are not uncommon for a few weeks in the winter.

The district is well forested and is located in the Umpqua National forest. Forest maps can be had by applying to the United States Forest Service, Portland, Oregon.

The rocks of the district are largely Cascades andesitic lavas, which make up a large part of the Cascade range; also mica schists, in which most of the mining development of the district has been done. The ores are copper sulphides carrying some gold and silver, and cinnabar has been reported from this district.

GREEN MOUNTAIN DISTRICT

The Green Mountain district is located in southern Douglas county near the Jackson county line, about 20 miles east of Glendale, at the head of Starve-out creek. A fair wagon road is built to a nearby point, most of the district being reached only by trail. The elevation of the summit of Green mountain is about 4800 feet.

The country rocks in the district are a much sheared and altered greenstone, which makes up most of the mountain. Some slates and other sedimentary rocks are found. The ores are usually found in the greenstone, the minerals being chalcopyrite, pyrite and pyrrhotite.

RIDDLE DISTRICT

The Riddle district is situated in the south central part of Douglas county, and as used in this report is the area in the vicinity of the town of Riddle, situated on the main line of the Southern Pacific railroad, and including the country lying farther west in the neighborhood of Nickel mountain.

The elevation of the district varies from about 600 feet at the Southern Pacific railroad at Riddle to more than 3500 feet at the summit of Nickel mountain.

The annual rainfall is above 30 inches. The daytime temperature in the summer ranges from 75 to 100 degrees, while in the winter the temperature varies from somewhat above freezing to nearly zero.

There is a good wagon road from the town of Riddle to the top of Nickel mountain, 5 miles to the west.

The rocks of the district are largely of the basic igneous type altered to serpentine in numerous places. Sedimentary rocks, such as sandstone, shales and conglomerates are also found. The principal activity in mining is on Nickel mountain, where considerable bodies of nickel silicate ores have been developed. No production of nickel has been reported as yet from the district, but some shipments of chromic iron ore have been made during the summer of 1916.

GRANT COUNTY CANYON DISTRICT

The celebrated placer mines of Canyon are situated in the upper drainage basin of the South fork of the John Day river. The valley here widens to a broad depression, about 18 miles from east to west, and from 4 to 8 miles from north to south. In contrast to the narrow and heavily timbered valleys of the North and Middle forks, there is a bare expanse of gravelly pasture land with strips of alluvial soils along the river from a quarter mile to 1 mile wide. The elevation at John Day is 3000 feet; at Prairie, 3500. The climate is fairly mild and dry, the water supply ample; in consequence the valley was settled soon after the discovery of the placers, and has for 35 years supported a prosperous community of cattlemen and farmers. North of the river the hills rise gradually and culminate in a timbered ridge forming the divide between the Middle and South forks of John Day river. The eastern end of the valley is surrounded by dark forested mountains rising to about 6500 to 7000 feet. At the very head of the valley there is, however, an unexpectedly low pass (elevation about 4500 feet), through which a wagon road leads over to the Malheur river basin. South of the valley the picturesque Strawberry range rises abruptly, with serrated peaks, culminating in Strawberry butte, having an elevation of about 8600 feet. Toward Canyon the sharp ridges are a little lower, but still attain 8000 feet. The range presents a steep, but not very regular slope, with numerous salients and deeply incised canyons. Hot springs are found on Reynolds creek in the uppermost part of the valley.

The older pre-Miocene diabases, slates and serpentines at the north side of the valley have been described under the heading "Quartzburg District." In general there is a marked similarity of geologic structure between the Greenhorn mountains, Dixie butte and the Strawberry range. All of them are built up of diorites, diabases and serpentines, inclosing smaller masses of sedimentary rocks, usually clay-slate. Canyon peak, the bold salient from the main range which rises back of Canyon, consists of coarse gabbro or gabbro-diabase containing irregular masses of dark green finer grained diabase or diabase porphyry. This hill is celebrated for its rich pocket veins, and most of the placer gold in the vicinity is probably derived from its veinlets.

The placers of Canyon are justly celebrated as the most important and productive deposits of the kind in Oregon. They 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. 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 1870 it had already fallen to \$300,000 a year. In the following year the production was still further reduced, but remained for a long time about \$100,000. From that time on the production has gradually decreased to only a thousand or two each year until 1916, when a dredge began operation near the town of John Day.

GRANITE DISTRICT (Including Red Boy and Crane Creek Districts)

The Granite district includes all of the area drained by that creek except the upper parts of Olive and Clear creeks, which rise near Greenhorn and

extend as far west as the Ben Harrison mine. It also takes in the drainage of the North fork of the John Day as far west as the mouth of Crane creek, with the exception of that small part of the Cable Cove district which extends over into Grant county, and that part of the Cracker Creek district which extends across the divide into Grant county in the vicinity of the Ibex mine. It thus includes scattered placers of the North fork of the John Day, the territory on Crane creek which has sometimes been called the Crane Creek district, such scattered properties as the Monumental and La Belleview on the slopes of Bald mountain, the Granite district proper and the Red Boy district.

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

The southern part of the district, including the old Red Boy district, is argillite and related sedimentary rocks. The argillite continues north along the west side of the Bald mountain outcrop of granodiorite, and to the north 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 Granite and Sumpter districts. With the exception of the Monumental mine, practically all of the quartz mines are found in the argillites. These are well represented by the Red Boy and the Cougar mines, to which the reader is referred for details.

Placer mines are scattered quite generously over the district from north to south and much placer gold has been recovered in the past. Although the hydraulic placer mines are not yet exhausted, the chief possibilities for the future are in certain dredging areas of Granite and Crane creeks.

GREENHORN DISTRICT (Including Bonanza and Alamo Districts)

This district includes the eastern half of the Greenhorn range. Its western limit is practically defined by Granite Boulder creek, which flows south into the Middle fork of the John Day and the South fork of Desolation creek, a part of the drainage of the North fork of the John Day. The eastern part of the district takes in the headwaters of the North fork of Burnt river. The extremely irregular line which separates Baker from Grant county crosses this district.

Although a not rugged spur of the Blue mountains, the Greenhorn range is rather high and somewhat irregular. Vinegar hill, the highest point of the range, is about 8200 feet. The range extends from near Whitney to a few miles west of Susanville, a total distance of at least 30 miles.

Most of the territory is heavily timbered and only portions of the higher ridges are bare. It is well watered by many fair sized swiftly flowing creeks on both sides of the range.

The railroad shipping points in the district are Sumpter, Whitney, Tipton and Austin, stations on the Sumpter Valley railway. Wagon roads extend up most of the creeks to the important mines and prospects. Greenhorn is the only postoffice in the district.

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 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. The mine which has produced the most is the Red Boy. The mine which has the most ore blocked out is the Ben Harrison.

In the upper drainage basin of Granite Boulder creek there are several silver-gold prospects. With the exception of that near the Ornament the country rock is granodiorite.

On the opposite side of the Greenhorn range from Granite Boulder creek and near or within two miles of the main ridge are several silver-gold properties, of which the most important mine is the Ben Harrison, and the most important prospects are the Morris, Bimetallic and Intermountain groups. In the Ben Harrison the gold and silver values are about equal, while in the others silver is of chief importance.

In the vicinity of the Morning mine the properties are in a class by themselves, since they are mineralized dikes.

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.

NEW ELDORADO DISTRICT

Between Elk and Granite Boulder creeks the mountain streams flowing south into the Middle fork are Coyote, Big Boulder, Horse and Beaver creeks, of which Big Boulder, with its several branches, is the largest. Between the Middle fork of John Day river and the ridge above and largely in the drainage of Big Boulder creek is the New Eldorado camp.

The nearest postoffice and railroad station is Austin, from which the main wagon road to Susanville is followed for about 10 miles to the Thomas ranch. A mountain road extends from here for about 5 miles to the Heppner mine in the central part of the district. The middle and lower elevations are well timbered.

The prospects are in both granodiorite and greenstone. The ore deposits in the granodiorite are in both narrow fissure veins and wider replacement types. Some of the gold ores are free, at least near the surface. Other veins are more complex and contain mostly silver and antimony. In the greenstone area there are several properties in which obscure shear-zones are mineralized in places. Pyrite is the chief ore mineral, with some pyrrhotite and chalcopyrite.

QUARTZBURG DISTRICT

Prairie City, a terminus of the Sumpter Valley railroad, is on the John Day river near the mouth of Dixie creek. The Quartzburg district includes all of the drainage of Dixie creek and a small territory across the divide at the head of Ruby creek, which drains into the Middle fork of the John Day where the Dixie Meadow mine is located. The principal mines and prospects of this district are situated about 6 miles north of Prairie City and close to the branches of Dixie creek. A series made up of meta-andesites, some of which are amygdaloidal and some porphyritic, with altered tuffs and serpentines, and argillites make up the older rocks. Most of the flows are so chloritized as to warrant their being called greenstones. Veinlets and the amygdule filling evidence the alteration of the rock.

An intrusion into the greenstone, which is apparently a fine grained granodiorite, is exposed to some extent west of the camp. Its presence underneath the mining camp is made known by the numerous porphyritic dikes, which all have granodiorite tendencies. Many of these dikes are said to contain low values in gold. After the intrusion there was another period of shearing and fissuring, which furnished channels for hot ascending solutions that filled the fissures and shear zones with quartz containing gold, silver, copper and other sulphides.

In the shear zones on the eastern part of the camp there was much replacement of the shattered country rock. From this time on the geologic history is similar to the rest of eastern Oregon, in that flows of Columbia river lava were succeeded by the erosion which created the present topography.

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.

On the east fork of Dixie creek the country rock is made up of a series of old volcanic flows, where veins containing copper ores are found.

No change of Lindgren's report of 1900, which is quoted below, is to be noted. Locally the gross production from the Dixie placers is reported from \$600,000 to \$6,000,000. Probably the lesser amount approximates the truth. The depth of the gravel and the condition of the bedrock was not learned, but if these were proven suitable it might pay to install a dredge.

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.

The placers consist of the gravels accumulated in the present creek to a depth of 10 to 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.

SUSANVILLE DISTRICT

The Susanville district is about 22 miles down the Middle fork of the John Day river from Austin, a station on the Sumpter Valley railroad. A good wagon road could be built rather easily in place of the present one, which in 3

or 4 places deliberately leaves water grade to swing around over rocky ridges to return after some circling to the stream again. Not only is the distance longer, but the ascent and descent of rocky ridges makes it a disagreeable and expensive haulage road.

Galena, just below the mouth of Elk creek, and Susanville, about a mile up Elk creek from its junction with the Middle fork of the John Day, are the two postoffices. The district is well timbered, especially in the central part on the middle elevations.

The quartz prospects and mines of the Susanville district are confined to a belt extending northeast from Galena. This belt is less than 2 miles wide and less than 4 miles long. It has a great many prospects and mines. They are in slate, serpentine and porphyry, and a few are in greenstone. Most of the veins strike in an E.-W. direction, but most of those in the serpentine are N.-S. ledges.

HARNEY COUNTY

HARNEY (Trout Creek-Idol City) DISTRICT

Trout creek is a branch of Silvies river, which flows south into Malheur lake. This stream is an important one, which rises on the south side of the range south of the John Day valley. Its headwaters rise directly south of Canyon City. Until the railroad was extended from Vale up Malheur river, Harney district was more than 100 miles from the railroad. It is now between 20 and 30 miles from Crane, the present terminus of this line. The principal part of the district is in T. 20 and 21 S., R. 32 E.

Placer deposits were found in Trout creek in 1891 and approximately \$50,000 has been produced. The placer gold seems to have been derived from wide bodies of porphyry. This porphyry belt is about 4 miles long and 1½ miles wide extending from southwest to northeast. Ledges have been found which carry from \$3 to \$36 in gold and one to 80 ounces in silver. The principal country rock is granite. The ore, with the exception of the shallow oxidized portions of the veins, is base and could not be sent to the smelters because of the long wagon haul. It is the intention of the owners of the Trout Creek Mining and Milling Company, the active property in the district, to ship ore in 1917, now that the railroad has been completed as far as Crane. This district has not been visited and the statements above are from the press and private sources of information.

PUEBLO MOUNTAIN (Denio) DISTRICT

With the exception of the area to be described, practically all of the southern half of Malheur county is covered by basalt, rhyolite and associates tuffs. The exception is Pueblo mountain and area which extends from beyond the Nevada line north for about 10 miles. This mountain rises abruptly a short distance west of Denio, Oregon, a postoffice about 110 miles north of Winnemucca, Nevada, the nearest railway station. It is composed of rock that belongs to an older series than do the lavas to the north. It is apparently made up of andesite porphyry, micaceous schists and granitic rocks, which have been more or less extensively affected by mineralizing agents.

Some prospecting has been done and good specimens of carbonate ores of copper, as well as native copper, have been found, but the distance from the railroad is so great as to discourage prospecting and development of the copper ores.

JACKSON COUNTY

ASHLAND DISTRICT

The Ashland mining district is situated near the town of that name about 12 miles north of the California boundary in Jackson county, Oregon. The

most important mines in the district are on the ridge a few miles west of Ashland, but other mines of note are situated farther west on Wagner creek, to the south of Ashland creek, and to the east-southeast on Sampson creek. The district varies in elevation from about 1900 to over 4000 feet above sea level. It occupies the valley of Bear creek, a tributary of Rogue river, and as used in this report, the west boundary will be Anderson creek, and the divide between Bear creek and the Little Applegate river; the north boundary the north line of T. 38 S.; the east boundary the east side of R. 2 E., and the south boundary the Siskiyou divide.

The annual rainfall of the district is about 30 inches. There is considerable snowfall in the higher elevations, while in the lower altitudes the snow rarely stays on the ground more than a few weeks. The ordinary daytime temperature in summer is between 75 and 90 degrees while in the winter it varies from above freezing to 10 degrees above zero.

The southern portion of the district is well forested; in the northern part the forests are scant. This district is in part in the Crater National Forest.

The main line of the Southern Pacific railway runs through the district and the principal towns are Ashland, in the central, and Talent, in the western part.

The earliest mining in the Ashland district was probably done in 1858; it was in that year that the mining district called Forty-nine Diggings was organized. For about two decades the chief mining activity was in the placer deposits, but the interest gradually shifted to underground mines, and as early as 1880 several of these had been discovered and opened in a small way. About 1890 the Ashland mine was worked more actively and during 1892-1899 its output was about \$150,000. About the same time the Shorty Hope and Mattern mines were productive. During the following decade development work continued more or less regularly at the Shorty Hope mine on Wagner creek, but the production of the district decreased considerably. The quartz mines are usually well-defined fissure veins with quartz as the principal gangue material, the most important values being gold.

The town of Ashland is located on the border of the intrusive igneous mass which forms the heart of the Siskiyou mountains. To the north and east of Ashland, Bear creek valley is eroded in Cretaceous and Tertiary sediments which lie in beds dipping to the northeast away from the igneous intrusion. To the south and west of Ashland the central part of the mountains is formed of a coarse-grained rock which solidified from fusion while a great mass of fused rock material was at considerable depth below the surface. On the east side of Bear creek valley the mountains are formed of nearly horizontal layers of volcanic rocks which took their present position by flowing over the surface as great floods of lava.

The oldest rocks of the Ashland district are those found along Wagner creek (especially in the ridge to the west), which consist of amphibolites and hornblende and quartz mica schists probably produced by the effects upon sedimentary formations of the intrusion of the (once) hot and liquid rock mass composing the mountains to the east. These rocks may be correlated with the Salmon and Abrams formations of Hershey, which he assigns tentatively to the Precambrian. East of Wagner creek are sandstones and argillites with some limestone lenses, which are probably of Paleozoic age.

The next younger series of rocks consists of the great intrusive mass in its various phases. This rock is chiefly tonalite or quartz diorite, that is, it is a coarse-grained igneous rock composed of sodic plagioclase feldspar, quartz, and hornblende or biotite or both. The plagioclase feldspar is accompanied in some parts of the mass by orthoclase feldspar; the rock is then called a granodiorite. In other places the plagioclase is largely replaced

by orthoclase and the rock is a true granite. Commercially all these rock types pass as granite, and one kind is just as good as any other for use as a building or ornamental stone. Associated with these massive igneous rocks and probably from the same source there are numerous dikes of fine-grained igneous rocks of the same general composition as the former, but containing a larger proportion of light colored minerals. They are called aplites in general, some varieties present in this region being tonalite-aplite, plagiaplite, and diorite-aplite or malchite. Near the borders of the igneous intrusion it is less siliceous in some places and contains no quartz; it is then a diorite.

After the intrusion of these igneous rocks there was a long period of erosion during which the surface was gradually lowered hundreds and perhaps thousands of feet, just as it is being slowly worn away today. The materials removed by erosion were carried away by the streams and deposited in quiet water at some distance. For a long time the region of deposition included the area now occupied by Bear creek valley. At the beginning of this time the rocks formed were conglomerates, which were succeeded by sandstones, in large part containing abundant fragments of feldspars and called feldpathic sandstone or arkose. Some of these rocks contain fossils which give silent testimony that they were formed in Cretaceous times. Later the material deposited included finer sands and even clays. At one time the region was swampy or controlled by other conditions favorable to the development of luxuriant vegetation, which accumulated under water (without weathering) and gradually formed thick beds of peat which finally turned into coal. Near the close of this period of deposition the formation of ordinary sediments was interrupted one or more times by volcanic activity in the mountains to the east, which produced great quantities of volcanic ash that was brought by winds (and water) into beds resembling the finer sedimentary rocks derived from erosion. Fossil leaves found in the coal and in the adjoining rocks show that these deposits were formed in the Tertiary period.

At the close of this period the sedimentary beds were somewhat tilted by elevation of the Siskiyou range or depression of the Cascades so that they dipped at an angle of 10° to 25° toward the northeast. At about the same time the great lava flows from the volcanic vents of the Cascade range covered the sediments which then filled the present site of Bear creek valley, and flowed westward to the slopes of the Siskiyou mountains. These lavas are commonly called basalts, but for the most part they are auganites, andesites, and rhyolites, that is, they contain more silica and alkalis and less iron and magnesia and lime than do the basalts. All of these rocks furnish excellent road materials. In some places the rhyolite has been much altered to a clay which may be of value.

After the cessation of volcanic activity there followed a long period of erosion during which the lava flows were slowly worn away. Along the margin of the flows they were somewhat less compact and were therefore removed a little more rapidly. Thus Bear creek valley originated, and was gradually deepened and widened to its present size, not only cutting through the lavas but also through about a thousand feet of the underlying sedimentary rocks. As an incident of this erosion there are shallow temporary deposits of river gravel and silt of recent formation in various places near water level in the valley. These stream deposits are the most recent formations in the region; indeed, they are still in process of deposition more or less irregularly.

This district has large deposits of excellent granite for building stone in numerous places on the northern slope of Ashland mountain. (For description see Vol. I, No. 2, Mineral Resources of Oregon.)

The Ashland district has the greatest variety and quantity of mineral waters of any section of the state. The city of Ashland has very extensively developed certain springs in the neighborhood, the mineral waters being piped into the city for several miles where it is made available for public use in a most attractive city park. (For a more detailed description of the mineral springs in this district see Vol. I, No. 5, Mineral Resources of Oregon.)

ELK CREEK DISTRICT

Elk creek district is in the northeastern part of Jackson county, and occupies the area drained by Elk creek, a tributary of the Rogue river. The north and west boundary of the district is the Douglas-Jackson county line; the east boundary, the divide between Elk creek and Mill creek; and the south, the Rogue river.

The climate is mild, the usual daytime temperature in summer being from 60 to 85 degrees and in the winter from freezing to 10 above zero. The total rainfall of the district is about 40 inches. The snowfall is small in the lower altitudes, while in the higher altitudes it attains at times a depth of 3 or 4 feet for a few months. The elevation of the district varies from about 2000 feet to over 5000 feet.

It is a heavily forested area and is within the Crater National Forest. Some excellent forest maps showing trails, roads and general drainage can be had by application to the U. S. Forest Service, Beck Bldg., Portland, Oregon. This district is covered by the topographic map known as the "Ashland Sheet," published by the United States Geological Survey, and same can be had by application to the Superintendent of Public Documents, Washington, D. C.

Medford is the nearest railway point, some 40 miles distant. The district is served by the Medford-Crater Lake auto road as far as the mouth of Elk creek, $2\frac{1}{2}$ miles east of Trail postoffice. Here the Elk creek road leaves the Crater Lake road and continues in a northeasterly direction for about 25 miles to the mines.

The only mine in the district from which production has been reported is the Buzzard, operated by the Pearl Mining Company. Some high grade sulphide ores have been shipped from this property.

The geology of the district observed hastily seems to be quite simple, and consists of a series of flat-lying Cascades andesite flows. Vertical fissuring has taken place locally, producing fractured zones, which furnished opportunity for the mineralizing waters to place ore deposits in their crushed or brecciated portions. Some of the highest grade sphalerite known in the state has been produced from this mine, often running as high as \$500 per ton in gold.

GOLD HILL DISTRICT

In this report the Gold Hill district includes the whole Rogue river valley from Central Point and Table Rock westward to Josephine county. It is limited on the south by the divide between Rogue and Applegate rivers and includes tributaries of Rogue river from the south, namely, Kane, Galls, and Foots creeks, and from the north, namely, Sams, Sardine, Wards, and Evans creeks. There are many placer and auriferous quartz mines in the district and other mineral resources of various kinds. There are no large cities in the area, but the town of Gold Hill, on the Southern Pacific railroad, is headquarters for the most active part of the region. Near Central Point and Table Rock the Rogue river occupies a wide valley; only a few miles to the west it enters a narrow valley from which it does not emerge until it reaches Josephine county. The Gold Hill district is a mountainous region cut by one narrow east-west valley and its tributaries from the north and south. The elevation varies from less than 1000 feet at the mouths of Evans

and Savage creeks to nearly 4000 feet on top of Fielder mountain, and similar elevations both north and south of Rogue river. The Southern Pacific railroad runs through the district east and west, following Rogue river. The district is well served with wagon roads and trails by which any section can be easily reached.

The annual rainfall of the district is about 30 inches. There is considerable snowfall in the higher portions, while in the lower altitudes the snow rarely stays on the ground more than a few weeks. The ordinary daytime temperature in summer is between 75 and 90 degrees, while in the winter it varies from above freezing to 10 degrees above zero.

The Gold Hill district, as the name is here used, includes half a dozen areas which were at one time organized as mining districts. Thus, the Foothills creek district was formed in 1853; the placer gold here was unusually coarse. The Evans creek and Pleasant creek districts were organized in 1856, but the rich pocket from which the town of Gold Hill takes its name was not discovered until January, 1859. It is said that \$400,000 was taken out the first year. During the seventies placer mining continued somewhat less actively, about half the miners being Chinese. In 1884 placers on Galls creek were notably successful, while gold bearing gravels on Foothills creek were profitable throughout the decade. During the nineties the output of the placers decreased, but work continued on many creeks of the region. During the first decade of the twentieth century placer mining continued on Foothills, Galls, Sams, Sardine, and Pleasant creeks, one dredge being used on Foothills creek, a 7-mile ditch constructed on Sams creek, and other improvements made in the district. On the whole, the production of the placer mines has been maintained for a long time, but is slowly decreasing, and no large auriferous vein deposits have yet been developed to adequately take their place, although several have been opened near the surface during the last ten years. Thus, the Millionaire mine about 3 miles southeast of Gold Hill was opened by a vertical shaft to a depth reported to be 400 feet, the Bill Nye mine about 3 miles south of Gold Hill was opened by several adits, and considerable work was done on the Tinpan, the Lucky Bart, and other mines. These and other mines were more or less productive at various times during recent years.

A great variety of minerals is produced in this district. In the northern part, near the headwaters of Evans creek, there is considerable development of quicksilver in progress. There is a good tungsten prospect about $3\frac{1}{2}$ miles north of Gold Hill, and gold quartz mines and prospects are well distributed.

The Gold Hill district is a region occupied chiefly by old Paleozoic sediments interbedded with sills or flows of andesite and greenstone. Everywhere the sedimentary rocks strike northerly, usually about N. 15° E. and dip eastward at angles ranging from 65° to nearly 90°. Diller has shown that Jurassic beds near Waldo have been overturned so that the oldest strata now overlie the younger formations. It seems probable to the writer that the Paleozoic sediments are also overturned, and that limestones found on Kane creek are probably of early Paleozoic age, and fossils found in limestone lenses on this creek indicate that they are not Devonian; the writer would suggest that they are Silurian rather than Carboniferous in age. Fossils found in limestone lenses on Cheney creek and south of Waldo were considered as probably Devonian in age by E. M. Kindle of the U. S. Geological Survey in 1909; others collected by the writer on Cheney creek in 1913 were considered by the paleontologists of the U. S. Geological Survey to belong probably to the Carboniferous. Accordingly the Paleozoic sediments west of Kane creek in the Gold Hill district are referred to the Devonian or Carboniferous or to both periods.

Long after the formation of these Paleozoic sedimentary rocks the region was intruded from below by a mass of molten igneous rock; at about the same time and perhaps by the same agency the bedded rocks were closely folded and overthrust to the westward. The intrusive rock solidified beneath a considerable thickness of sediments or other rocks, which has since been removed in some places. Thus, the igneous mass is now exposed to view in the mountains at the head of Kane creek, and extends thence northeastward nearly to Central Point and thence northwestward past Tolo and Ray Gold to the west side of Blackwell Hill; the same rock outcrops in the N. E. $\frac{1}{4}$ of Sec. 35, T. 35 S., R. 3 W., on the west side of Sams valley; a similar rock of aplitic texture outcrops near the south line of section 15, T. 37 S., R. 4 W., on the right fork of Foots creek, and it seems probable to the writer that it underlies at considerable depth a large part (or all) of the Gold Hill district.

This igneous intrusion and intense folding seems to have elevated the region enough to cause a new cycle of erosion and the formation of coarse sediments which could not be transported far by ordinary agencies. Therefore conglomerates were produced, and these were succeeded by feldspathic sandstones during part of Cretaceous time. Rocks produced in this way are now found between Evans creek and the headwaters of Sams and Sneider creeks; similar rocks are doubtless covered by later lava flows near the Table Rocks. Along Evans creek from the "Meadows" northward these Cretaceous sandstones are overlain by a considerable thickness of Tertiary sandstones which contain some thin beds of coal.

The latest rock formations in the district consist of stream deposits some of which are very valuable on account of the gold they contain. They are formed along all the streams of the district, but are not abundant along Rogue river in this region because the latter is here in a narrow rock-cut portion of its course to the sea.

This district is one of the most important in Southern Oregon in the quantity and quality of its limestone deposits. The Beaver Hill Portland Cement Company has completed a large plant at Gold Hill which began operations in the summer of 1916. The district has good road materials of several kinds including granite, limestone and basaltic lavas. (For more detailed description of limestone, building stone and road materials, see Mineral Resources of Oregon, Vol. I, Nos. 2, 5 and 7.)

JACKSONVILLE DISTRICT

For the purposes of this report the Jacksonville or Medford district is bounded to the southeast by the Ashland district, and includes all of Bear creek valley between Phoenix and Central Point; to the southwest it extends to the divide between Bear creek and Little Applegate river; to the northeast it is limited by Antelope creek. The most important mines in the area are near Jacksonville, and that town has been a mining center for five decades. It is still the county seat, but Medford, only four miles away on the main line of the Southern Pacific railroad, has grown so rapidly that Jacksonville commercially is only a suburb of the larger city. There is a branch railroad connecting Jacksonville with the Southern Pacific railroad at Medford. The district varies in elevation from about 1400 feet above sea level near Medford to approximately 4400 feet on a spur of Grizzly mountain, about 3 miles west of the Sunnyside coal mine.

In later years there has been considerable development in quartz mining. The veins are well-defined, having quartz as the principal gangue material, the most important values being gold.

The annual rainfall of the district is about 30 inches. There is considerable snowfall in the more elevated portions, while in the lower altitudes the snow rarely stays on the ground more than a few weeks. The ordinary daytime temperature in summer is between 75 and 90 degrees, while in the winter it varies from above freezing to 10 degrees above zero.

A large part of the area of the district is a rich farming section, only a small portion of the higher elevations being forested.

Gold was discovered near the present site of Jacksonville in the fall of 1851 and mining in the region began as early as 1852, in which year the district was organized as a result of the first influx of miners from California. Jacksonville was for a time the seat of a county government which extended nominally from the Pacific ocean to the Rocky mountains and actually exercised legal authority from the ocean to the interior of Oregon. The placer mines on both forks of Jackson creek were the object of the first mining operations, and furnished large returns for several years. As early as 1870 the industry became less profitable and gradually passed into the hands of Chinese.

Two quartz mills were erected during the 60's; the Hopkins mill on the left fork of Jackson creek was not successful, and as early as 1869 it had been converted into a sawmill. The Occidental mill on the right fork of Jackson creek cost \$10,000; it was equipped with 10 stamps, 2 rotary pans, and 40 horse power, and had a crushing capacity of 20 tons a day.

The geology of the Jacksonville district is in some respects more complicated than that of the Ashland region. As in the latter, the chief valley (Bear creek) is occupied by Cretaceous and Tertiary sedimentary rocks, overridden on the northeast by lava flows, but the mountains to the southwest are formed by much altered Paleozoic sediments and old andesitic rocks. The great igneous mass forming Mount Ashland has its counterpart only in an area of granitic rock in the hills west of Central Point extending from the forks of Jackson creek northeast nearly to Central Point and thence northwest to Tolo and Ray Gold in the Gold Hill district.

The geological history of the Jacksonville district is very similar to that of the Ashland area. The oldest rocks of the region are highly altered Paleozoic sediments in the mountains south of Medford; they are closely associated with old andesitic rocks. Near Jacksonville these sediments consist chiefly of shales which strike N. 10°-20° E. and dip 75°-90° W. These formations were intruded by a granitic mass which occupies a huge irregular dike-like area extending northeastward from the forks of Jackson creek. After a long period of erosion had uncovered and partly removed these rocks the deposition of Cretaceous conglomerates occurred, covering much of this district with a layer of which only fragments now remain. According to paleontologists of the U. S. Geological Survey fossils collected by the writer from this conglomerate include specimens of *Trigonia leana* Gabb, *Modiola siskiyouensis* Gabb and *Dentalium*, which show that the rock belongs to the basal beds of the Chico formation of the Cretaceous. A thin nearly horizontal layer of this conglomerate is still left at points along Jackson creek; it is reported on top of the ridge west of Jacksonville. The whole of Bear creek valley was apparently a region of deposition (with one interruption) from the time of the Chico at least to the close of the Eocene. The formation of the basal conglomerate was followed by the gradual deposition of at least 500 feet of feldspathic sandstones containing some conglomerates, and also some beds of coal. These rocks occupy the whole of Bear creek valley and form the lower cliffs on the northeast side. Fossil plants collected by the writer at the Cascade and Sunnyside coal mines and also from a shaly sandstone about half a mile easterly and 500 feet higher than Beeson's coal mine include, according to F. H. Knowlton of the U. S. Geological Survey, samples of laurel, poplar, fig-tree, linden, brake, and fern (*Laurus similis*? Kn, *Populus Zaddachi*? Heer, *Ficus* sp. cf. *sordida* Lesq., *Grewia* sp. cf. *G. celastroides* Ward, *Pteris* sp.? and *Anemia* sp.?) which "appear to indicate reference to the Eocene."

After the deposition of these sedimentary rocks they were covered by great lava flows from volcanoes in the Cascade range. The lavas consist of auganite, andesite, basalt, and rhyolite; they covered the whole of Bear creek valley to a depth of hundreds if not thousands of feet, but they probably did not extend far beyond the divide south of Jacksonville. Erosion has now removed them from the valley except for the remnants forming the tops of Upper and Lower Table Rocks. The same cycle of erosion has also removed much of the sedimentary rocks which were covered by the lavas, thus forming Bear creek valley.

The latest rock formations in the district are the shallow stream gravels which may shift repeatedly as the years pass, but under favorable conditions may be more permanent and of greater thickness and importance.

This district has an abundance of granite and sandstone for building purposes, and andesites and granites for road materials, all of which have been developed to some extent within the past few years. (For more detailed description see Mineral Resources of Oregon, Vol. I, No. 2.)

UPPER APPLGATE DISTRICT

In this report the Upper Applegate district includes all that part of Jackson county which is drained by the Applegate river. On the north and east it extends to the divide between Rogue and Applegate rivers, on the south it is limited by the California state line, and on the west by the Josephine county line. As thus limited the district is a large one, being some 25 miles north and south on the west side and the same distance east and west on the south side, and includes such old district names as Steamboat, Sterling creek, Thompson creek, Ferris gulch, Humbug creek, Sterling peak, Squaw creek and Buncom. The district has no railways, but stages run from Grants Pass by way of Murphy and Provolt to Applegate and Steamboat, and also from Jacksonville by way of Ruch up the Applegate river to Watkins and Hutton. The region is very mountainous, varying in elevation from about 1200 feet where Applegate river enters Josephine county to 3000 to 5000 feet everywhere except along the water courses and to 7377 feet at the summit of Sterling peak, about 20 miles south of Medford. The largest valley lands are near Ruch and Applegate, where some very rich farming land is under cultivation. Elsewhere the region is used as a stock range, or for timber or mining.

The annual rainfall of the district is about 40 inches. There is considerable snowfall in more elevated parts, while in the lower altitudes the snow rarely stays on the ground more than a few weeks. The usual daytime temperature in summer is between 75 and 90 degrees, while in the winter it varies from above freezing to 10 degrees above zero.

The Upper Applegate district was organized by placer miners in 1853, but at that time it included only the region within a few miles of the mouth of Forest creek. The Sterling district was organized the following year; it included the region of the creek of the same name. Soon afterward the Buncom district was established to serve the placer miners along the lower part of Little Applegate river. Before 1865 the rich gold ore at Steamboat was discovered and removed. As early as 1870 much of the placer ground had passed into the possession of Chinese, who were content with small returns and continued for at least ten years reworking the gravels left after the first work of the white men. In 1882 Beck and Epperson were using hydraulic methods near Steamboat and finding coarse gold. The same year Berryman and Hansen ran drifts in consolidated gravels near Applegate. J. T. Layton was operating a placer mine on Ferris gulch as early as 1884; in 1886 he had a ditch 23 miles long with a giant operated under a head of 300 feet. The Sterling placer mine had a ditch of the same length with a

head of 250 feet and 2 giants operating all the year. During the next five years the Layton and Sterling placers were the most important mines in the district. In 1891 the Sturgis placer on Forest creek became the leading producer, but in 1895 the Layton was again the leader, and in 1901 the Pearse placer on a branch of Forest creek near Jacksonville was very active. In 1903 the Sterling mine was again the most successful while the Sturgis and Pearse were active.

Numerous placer mines in this district continue to be important contributors to the placer production in southern Oregon. Interest in quartz mining is increasing but has not yet reached a stage of steady production.

The oldest rocks in the Upper Applegate district are probably the hornblende and mica schists in the ridge north of Elliott creek and on Dutchman's (Sterling) peak and Red mountain. They are intruded by andesitic and serpentinized dikes and also modified by intrusions of tonalite. These schists may be correlated with the Salmon and Abrams formations of Hershey, who has considered the mica schist to be the older, and has tentatively placed both groups in the Precambrian. The mica schist is well shown on the road from Hutton to the Blue Ledge mine, where a graphitic layer with minor folds is exposed at an elevation of about 3800 feet. The hornblende schist, or Salmon group, is well displayed on Red mountain where it is intruded by basic dikes and considerably recrystallized, in places developing a bladed actinolite rock. About a mile and a half north of Red mountain on 7-mile ridge an amphibole schist contains bands of fine grained quartz and some epidote. On the eastern peak of Red mountain some of the serpentine seems to be an alteration product from amphibolite.

Both the Salmon and Abrams formations apparently conform in strike and dip with the Paleozoic rocks. A study of the relation of the bedding and cleavage in a banded slate at the Blue Ledge mine seems to indicate that the series is overturned.

The Upper Applegate district is occupied in large part by old Paleozoic sedimentary rocks with interbedded sills or flows of andesitic character. In places these bedded rocks are penetrated by dikes of dark igneous rocks and also by larger irregular masses of tonalite. The sediments in general strike about N. 20° E. and dip at a high angle to the eastward. As elsewhere shown for this entire region they have perhaps been overturned so that the oldest beds now lie above the younger. On this basis the oldest Paleozoic rocks are the argillites and sandstones containing limestone lenses near Watkins and on Little Applegate river and its tributaries. They have been intruded by andesitic and serpentinized dikes, and are in places highly altered. They are also modified by intrusions of tonalite. Serpentine, derived in part from dunite, is abundant on Red mountain, which obtained its name from the color of the thoroughly oxidized soils derived from it and similar highly ferruginous rocks. The serpentine is cut by seams, some of which are occupied by chlorite and others by talc. It is also marked in some places by long conspicuous needles of actinolite. On the eastern peak some of the serpentine is derived from the alteration of amphibolite.

The Siskiyou tonalite batholith extends southward to Siskiyou gap between mount Ashland and Red mountain. Smaller tonalite intrusive masses outcrop near the batholith, as on Dutchman's peak, and less than 2 miles to the southwest on Elliott creek ridge north of Silver fork. Tonalite was also observed in masses of various sizes at other places in the district; the largest mass noted was on both sides of Applegate river at Watkins and for about a mile to the southwest; the same mass may be continuous with an outcrop in Sec. 32, T. 40 S., R. 3 W. between Squaw creek and French gulch. Other masses were observed in Secs. 26 and 35, T. 40 S., R. 4 W. West of Grouse creek, in Sec. 34, T. 40 S., R. 3 W. along Lyman creek, and in Secs. 29 and 31,

T. 40 S., R. 2 W. north of Squaw creek, as well as in Secs. 7, 8 and 18, T. 40 S., R. 2 W. north of Beaver creek and in Secs 18 and 19, T. 40 S., R. 2 W. west of Glade creek. Finally, outcrops of tonalite were observed in Secs. 10, 15 and 27, T. 38 S., R. 4 W. north and south of Applegate, and a mass noted in Sec. 24, T. 38 S., R. 5 W. probably extends eastward at least to the slopes of Ferris gulch. The wide distribution of the tonalite makes it reasonable to believe that the Siskiyou batholith underlies a large part or all of the district, a deduction of much importance in considering the probable source of the ore deposits.

Deposits of Mesozoic and Tertiary age are unknown in the Upper Applegate district although Cretaceous conglomerates are reported on the border of the region on the ridge west of Jacksonville, and it may well be that such rocks once covered a much larger area.

Pleistocene and Recent stream gravels and silts are not abundant in the district because most of the gradients are too steep and the valleys too narrow to permit their accumulation, but such deposits are found along the Applegate river and some of its tributaries, and in some places they have proved of value as a source of placer gold.

There are numerous good deposits of granite and sandstone for building purposes in this district, but these are not developed on account of being so far from transportation. The greenstones and argillite found in large quantities in different parts of the district have been used as road material with good results. An abundance of limestone of good quality is found on Steamboat creek and Elliott creek in the southern part of the district, and also on the Little Applegate river in the eastern part of the district. (For a more detailed description of these deposits see Mineral Resources of Oregon, Vol. I, Nos. 5 and 7.)

A deposit of antimony ore is known near Watkins and another reported on Forest creek. A small shipment was made from the former during the past summer, but owing to transportation difficulties, has not as yet proven a success.

JEFFERSON COUNTY

ASHWOOD (Trout Creek) DISTRICT

Trout creek is a branch of the Deschutes river, whose source is on the opposite side of the range from that of Ochoco creek, mentioned in the description of the Ochoco or Howard mining district. This district is in the immediate vicinity of Ashwood, about 25 miles directly south of Shaniko, a terminus of one of the branches of the O.-W. R. & N. Co.

The nearest timber is about 15 miles south on the headwaters of Trout creek. In the vicinity of Ashwood the country is covered with sagebrush and the hills are rolling with frequent deeply incised canyons.

The ore deposits are in mineralized shear-zones in andesite and vary from narrow to widths as great as 20 feet. The ores are gold and silver, contained in pyrite, galena, chalcopyrite and sphalerite.

JOSEPHINE COUNTY

GALICE DISTRICT

As the name is used in this report, the Galice district includes the whole northwest corner of Josephine county; that is, it is the area (within the county) drained by Rogue river that lies north and west of the mouth of Jump-Off Joe creek and also west of the Southern Pacific railroad, and bounded on the southwest by the divide between the Rogue river and the Illinois river.

The Galice district, as thus defined, includes areas which have been known under various names in the past, especially Galice, Mt. Reuben, Merlin, Glen-

dale and Rogue river. Except for a few placer deposits, the mines of the district are confined to T. 33, 34 and 35 in R. 8 W. of the Willamette meridian. The region is mountainous, and yet the topographic features are dominated by a high-level peneplain deeply dissected by the canon of Rogue river and less deeply cut by the numerous tributaries of that stream. The old peneplain is too much dissected to be recognized by any large level surfaces, but it is inferred from the accordance of summit levels on both sides of Rogue river and the uniformity of sky-line in other parts of the district. Elevations in the area vary from about 600 feet along Rogue river to the level of the peneplain (somewhat above 3000 feet) and to higher altitudes on more or less isolated peaks of 4000 feet or more.

It is a well forested region, being a part of the Siskiyou National Forest. The district is served by a good wagon road from Merlin, 15 miles from Galice postoffice and 18 miles from the Almeda mine. Some other short wagon roads are found in different parts of the district as branches of this main trunk line and good trails furnish communication with all parts of the region.

The annual rainfall is about 40 inches. There is considerable snowfall in the higher parts, while in the lower altitudes the snow rarely stays on the ground more than a few weeks. The ordinary daytime temperature in summer is between 75 and 90 degrees, while in the winter it varies from above freezing to 10 degrees above zero.

Placer mining on Galice creek began about 1854 and has continued more or less steadily ever since, although with irregularly diminishing activity. During the '50s the work was directed especially to the most accessible and richest deposits. On account of the partial exhaustion of such gravel beds, there was some decrease in activity during the '60s. In the next decade some of the slightly less accessible deposits were opened by means of ditches and flumes, some of them of considerable length. By 1880 the small placers were chiefly in the hands of Chinese, who reworked and extended old workings with some profit. In 1883 Galice creek district made an output estimated at \$8000. In 1886 quartz mines increased in activity in this area. In the '90s the quartz mines of the Mt. Reuben district became prominent, and in 1897 the principal quartz mining in southern Oregon was in this district. In 1898 the Gold Bug mine had a 5-stamp mill which was yielding good returns, while the Golden Wedge mine put its ore through an arrastre. These mines continued active during the next five years. In 1905 the Almeda mine was already in course of development and in 1908 a 100-ton matting furnace was built at the mine. In 1907 the Oriole was the scene of some activity, which has continued with minor interruptions to the present time. In 1908, 3000 feet of underground development work was done at the Almeda and three quartz mines in the district produced \$23,580 worth of metals. In 1910 the producing mines included the Oriole, Gold Road, Nesbit and Sugar Pine, the last one using a 10-stamp mill. In 1912 the Almeda smelter was operated for thirty days, and the following year it was in operation about the same length of time.

During 1915 and 1916 the Almeda mine has been operated in a small way most of the time.

The geology of the Galice district is relatively simple. Aside from small deposits of stream gravels the rocks of the area are either Jurassic sediments or igneous intrusives (possibly with some extrusives). The general strike of the sediments and also of the contact between the sediments and the igneous rocks is about N. 20° E.; the sediments dip steeply to the eastward, but are overturned according to Diller, so that the strata to the west are younger than those near Galice. He has designated the Jurassic sediments at Galice by the name of that town, while those west of Whiskey creek he calls the Dothan formation.

The oldest rocks of the district therefore belong to the Galice formation, a conclusion which is supported by a report of a study by paleontologists of the U. S. Geological Survey of fossils collected at the Alameda mine by the writer. Director Smith of the Survey writes that these fossils all belong to the species *Aucella erringtoni* (Gabb), "which indicates Jurassic age and probably the Galice formation." The Galice formation consists of argillites, slates and thin bedded argillaceous sandstones. In the region where the county road crosses Rogue river (in T. 35 N., R. 7 W.), and elsewhere it is intruded by greenstones of various kinds. Igneous rocks between the Alameda mine and Tyee bar also separate the Galice formation from the Dothan formation, which occupies the whole northwest third of the Galice district, according to Diller. The Galice and Dothan formations are strikingly similar, if not identical, lithologically, and the reasons for separating them from one another are not apparent.

Near the footbridge across Rogue river between Grave and Whiskey creeks the cliff along which the river trail runs is composed of very light colored quartzose rocks with distinct and numerous parting planes resembling bedding. Here the cleavages strike N. 35° E. and dip about 60° S. E. About a mile up stream (south) a similar siliceous fine grained banded rock strikes N. 10° E. and dips very steeply eastward. With these exceptions Rogue river cuts through serpentine and various andesites and porphyries (more or less altered and locally called greenstone) between the Alameda and the Kramer or Elwilda mines. This mass of "greenstones" has been penetrated by intrusions of basic igneous rocks, now altered to serpentine, and also by dikes and more irregular masses of more siliceous igneous rocks. All of these rocks have been sheared and altered as a result of later earth movements, some of which were part of great mountain building processes. This shearing produced many fissures later filled by vein materials, which include ores in many places.

After this complex of Jurassic sediments and igneous intrusives took approximately its present position erosion and sedimentation began to modify its surface. Before the present gorges were cut out streams flowed over the surface in positions differing somewhat from their present courses. Here and there these streams deposited gravels which have not since been removed by erosion and form the "high level" placer deposits. Later the eroding power of the streams seems to have been increased, perhaps by uplift of the region, and they cut their present gorges and deposited gravels here and there along them, not only at their present levels, but also at higher levels within their existing narrow valleys. All of these gravels have been more or less useful as placer deposits.

GRANTS PASS DISTRICT

As the name is used in this report the Grants Pass district embraces the area in Josephine county south and east of the mouth of Jump-off Joe creek, which is drained by the Rogue river, exclusive of the Applegate river. It is limited to the northwest by the Greenback and Galice districts, to the east by the county line and the Gold Hill districts, to the south by the Lower Applegate district. It includes districts which have been known by the following names: Jump-off Joe creek, Winona, Merlin, Louse creek, Rogue river, Dry Diggings, Pickett creek and Grants Pass. The district is about 18 miles long east and west and averages 12 miles wide north and south. The city of Grants Pass gives its name to the district, being not only its commercial headquarters and railroad shipping point, but also the county seat and chief mining center of southern Oregon. The district is mountainous, ranging in elevation from about 800 feet above sea level at the mouth of Jump-off Joe creek to peaks reaching altitudes above 3000 and even 4000 feet. The highest point in the district is the top of Elk mountain about 1½ miles southeast of the Oro Fino mine and 7 miles northeast of Grants Pass. But the area between the county

seat and the mouth of Applegate river on the south and the station named Hugo on the north, which forms a triangle cutting the Grants Pass district in two parts as a wedge, driven northward, would do, is distinctly gentler in relief, presenting the aspect of a hilly region with wide and gently sloping valleys.

There is a large amount of rich farming land in the district and the higher elevations are well forested. The annual rainfall of the district is about 25 inches. It is common to have 3 or 4 feet of snow in the higher elevations, while in the lower altitudes the snow rarely stays on the ground more than a few weeks. In summer the day time temperature is about 75 to 90 degrees. In winter it rarely gets below 10 degrees above zero.

Mining began in southern Oregon in 1852, but during the first years the industry was apparently wholly outside of the Grants Pass district. Mining began on Josephine creek, west of Kerby, and spread to the Waldo and Lower Applegate districts, and even to the Galice district, before there is any record of work closer to Grants Pass. Finally the placer miners spread to Pickett and Jump-off Joe creeks. But the mining industry did not become important in the Grants Pass district until the placer gravels were largely exhausted and attention was directed to the quartz vein deposits. An 8-stamp mill was built at the Jewett mine in 1863; failure to make a success here seems to have delayed mining development in the region at least a decade. The Lucky Queen mine north of Walker mountain was equipped with a 10-stamp mill in 1886; the Fidelity mine made a small output in 1889; the Hammersley or Daisy mine on Bummer gulch was discovered in 1890, and the Baby mine on Walker mountain seven years later. The W. H. Flanagan mine on Pickett creek produced \$18,500 in gold in 1891. In 1898 the Jewett mine was an important producer, using its own mill, while the Baby mine sent its ores to a smelter. The Granite Hill mine was purchased by the American Goldfields Company in 1901, and three years later the Hammersley and Granite Hill were important producers. In 1902 extensive plans were made to construct a big dam across Rogue river about 3 miles above Grants Pass, in order to develop on a large scale the Golden Drift or Dry Diggings placer mine. In 1906 the latter was developed to a depth of 400 feet and equipped with a 20-stamp mill. In 1908 the Mountain Treasure put in a 2800-foot pipe line to develop water power for mining and milling purposes. In 1909 the Swastika hydraulic placer mine near Winona produced about \$10,000 in gold. In 1911 three placer mines were productive in the Jump-off Joe district, namely the Swastika, the Sexton, and the Cook and Howland. Most of the output of the Grants Pass district during recent years came from placer and deep mines along Jump-off Joe creek.

The oldest rocks of the Grants Pass district are in the eastern part, where the Paleozoic sediments of the Gold Hill district extend across the county line westward into Josephine county. In this region they consist of argillites and some argillaceous sandstones. The Galice formation (of the Jurassic period) is the name given by Diller to the argillites and thin-bedded sandstones occupying the eastern part of range 7 west, north and south of the mouth of Jump-off Joe creek. A rudely triangular area forming about the middle third of the Grants Pass district from the county seat and the mouth of Applegate river on the south to the station named Hugo on the north is occupied by a large outcrop of tonalite. An outlier of this tonalite is one of the country rocks of the Granite Hill mine; here it grades over toward granodiorite. On Walker mountain at the Gopher and Baby mines a gabbro is found which may be another phase of the tonalite. The rock at this place is in large masses distinctly schistose; in thin section it is clear that the tonalite has been sheared, even the feldspar showing curvature in its cleavages and twinning. It contains abundant plagioclase and quartz, some green amphibole and brown biotite, with a little magnetite and titanite. Alteration products are not important;

they include some sericite, epidote and kaolin. The gabbro on Walker mountain contains abundant labradorite and augite, with some chlorite, clinozoisite, sericite, and serpentine.

Less than half a mile down Bummer gulch from the Daisy or Hammersley mine the country rock is a micaceous arkose consisting of fine granular poorly rounded quartz, with some grains of plagioclase and orthoclase cemented by reddish brown biotite, or, elsewhere, by nearly colorless mica, probably muscovite. These quartzose sediments are associated here with volcanic rhyolitic breccias, containing fragments of quartzite, rhyolite, plagioclase, quartz, sericite, magnetite and volcanic dust.

At the Eagle mine on Walker mountain the country rock is argillitic, containing very fine grained quartz, pale brown mica, magnetite, and an opaque groundmass suggesting carbonaceous material.

The sedimentary rocks of the eastern part of the Grants Pass district are intimately associated with andesites at many places. These andesitic rocks seem to be interbedded with the argillites and sandstones, and probably occur both as sills and as flows. Both the argillites and the andesites are so much altered that it is difficult to distinguish them in the field. At the Mt. Pitt mine there is also some serpentine. In a few places the sediments are also associated with some rhyolite, often rhyolite breccia, whose intrusive or extrusive character has not been fully determined, though the available evidence favors the latter mode of formation.

The sedimentary rocks are not known to contain any limestone in the Grants Pass district.

The only rocks in the district younger than the Galice and Dothan formations of the Jurassic are the gravels of the various streams. These are of recent origin and belong to the present cycle of erosion. They are of some importance as sources of placer gold along Jump-off Joe and Louse creeks; the more extensive gravels of Rogue river near Grants Pass have also yielded gold, but not in proportion to their extent.

This district has some excellent deposits of granite and trap rocks of various kinds for building stone and road materials. (For further description see Mineral Resources of Oregon, Vol. 1, No. 5.)

GREENBACK DISTRICT

The Greenback district occupies the northeast corner of Josephine county and includes the area east of the Southern Pacific railroad, which is drained by Grave, Coyote and Wolf creeks. Parts of this district have in the past been known by the following names: Wolf creek, Grave creek, Coyote creek and Leland districts. Leland is the most accessible railroad station for points on Grave creek and Wolf creek station serves the rest of the district. The little town of Placer, 8 miles east of Leland station, on Grave creek, is in about the center of the district. The Hammersley mine is just outside of the district, being south of the divide between Grave and Jump-off Joe creeks. The whole region is very mountainous, varying in elevation from 1000 feet at the confluence of Wolf and Grave creeks to altitudes commonly reaching 3000 feet and attaining 4000 in a few places, such as a peak about a mile west of the Hammersley mine and another about a mile northeast of the Greenback mine. But the highest point in the district is on the eastern border at Onion Springs mountain, whose summit reaches an altitude of 5274 feet above sea level. The mountains are well covered with timber; the only arable land of consequence is along Grave creek.

The annual rainfall of the district is about 35 inches. There is considerable snowfall in the higher portions, while in the lower altitudes the snow rarely stays on the ground more than a few weeks. The ordinary daytime temperature in summer time is between 75 and 90 degrees, while in the winter it varies from somewhat above freezing to 10 degrees above zero.

So far as the published records show, Grave creek was not one of the regions early worked by the placer miners and the date of the discovery of gold in the region is unknown. But the auriferous gravel deposits of Grave and Wolf creeks were probably discovered as early as 1860 and it is known that the Grave creek placers alone produced \$20,000 in gold in 1883. During the rest of that decade there was a variable but continuous output from Grave and Wolf creeks. In 1895 there were small mines near Leland and Grave and others somewhat more important on Coyote and Wolf creeks, including one placer and two gold-bearing quartz vein mines. As early as 1898 the Greenback mine was a producer of some importance, although at that time its ores were treated in an arrastre. In 1900 the Greenback was owned by the Victor Junior Gold Mining Company and its development was more rapid. In 1902 and 1903 a 40-stamp mill was built at the Greenback, as well as a 100-ton cyanide plant. In 1904 it was excelled in production by only one mine in Oregon. About the same time the Martha mine was productive. The Lewis placer near Leland and the Columbia placer on Grave creek were operated in 1905, while the Greenback continued its large production. The latter was closed in August, 1906, and was idle for the next three years. In 1910 it was again a large producer, but soon after it closed and has not since then reopened. In 1912 the production came almost entirely from 10 placers on Grave creek and 4 placers on Wolf creek.

In 1916 activity was again resumed in the Greenback mine under new management, while the Dorothea and Jim Blain are also on the list of producers. The quartz mines of this section have their principal values in gold.

The Greenback district is occupied largely by rocks, which are either shales (or argillites) or igneous masses. The argillites are probably of Jurassic age, according to Diller, and are assigned to the Galice formation. The various types of igneous rocks range in age from Paleozoic to Cretaceous, according to Kay. The andesites are probably Paleozoic, or Jurassic, while serpentine intrudes Jurassic sediments and certain coarse grained plutonic rocks are referred to the Lower Cretaceous.

A sample of greenstone from the face of the crosscut into the hanging wall on the 9th level of the Greenback mine contains rounded crystals of quartz and phenocrysts of plagioclase, partly altered to sericite and epidote in a fine matrix of granular feldspar, quartz, sericite (or talc), fine needles of hornblende and titanite. It shows very distinct banding or flow structure and contains some later vein quartz and calcite.

A sample of greenstone from the face of a crosscut into the footwall from the 9th level of the Greenback mine contains abundant lath-shaped plagioclase, a little orthoclase, and some hornblende altering to chlorite, as well as much epidote and veinlets of calcite, siderite, epidote and pyrite.

A sample of greenstone from the breast of the long crosscut into the footwall from the 5th level of the Greenback mine contains abundant augite altering to green hornblende and chlorite, abundant labradorite, and some calcite and leucoxene. It is a coarse grained auganite.

A sample of rock largely altered to serpentine taken from a point near the breast of the main drift on the 9th level of the Greenback mine is too much altered to permit identification of the primary minerals; it contains abundant secondary calcite, some nearly colorless serpentine, some feldspar (which may be secondary adularia, as it shows only simple twinning), some isotropic chloritic material, and some kaolin.

In general the greenstone at the Greenback mine is of an andesitic type with variations to auganite and to dacite. A later intrusion of serpentine was originally a more basic rock than andesite. Another intrusion forming a dike on top of the Greenback ridge in the N. W. $\frac{1}{4}$ Sec. 4, T. 34 N., R. 5 W., is an aplite or micrographic granite consisting chiefly of a graphic intergrowth of

quartz and orthoclase with some plagioclase and quartz, and also a little zoisite, chlorite, epidote, titanite and magnetite.

ILLINOIS RIVER DISTRICT

The Illinois River district, as used in this report, includes the area in Josephine county north and west of Kerby, which is drained by the Illinois river and its tributaries. As thus defined, it is bounded on the west and northwest by Curry county; on the east and northeast by the Galice, Grants Pass and Lower Applegate districts, and on the south by the Waldo district.

The district has a mild climate, characteristic of the Rogue river valley, the usual daytime temperature in the summer being from 60 to 80 degrees, while in the winter it rarely gets colder than 10 degrees above zero. The rainfall is approximately 40 inches annually. In the lower altitudes snow rarely stays long on the ground, while in the highest altitudes 3 or 4 feet may remain for several weeks. The altitude varies from 1000 feet at the river to above 5000 feet in numerous peaks of the district.

Lack of transportation is a serious problem. The California and Oregon Coast railway will soon pass through Selma and Kerby, on the south boundary of the district. Wagon roads have thus far penetrated only a few miles from these towns, and all transportation is therefore confined to trails.

The area is quite densely forested and is included in the Siskiyou National forest. Excellent forest maps showing trails and general drainage can be had by applying to the Forest Supervisor at Grants Pass or the United States Forest Service, Portland, Oregon. A considerable portion of this district is covered by the Kerby topographic sheet, published by the United States Geological Survey, a copy of which may be had by application to the Superintendent of Public Documents, Washington, D. C.

The rocks of the district are fine grained sedimentaries, serpentine and greenstone. The sediments are found in the northwestern portion of the district and are composed of argillite, slates and clay-sandstones, called Dothan formation by Diller. These sediments have a general northeast strike and usually dip steeply to the southeast. The central part of the district is largely serpentine formed from the alteration of basic igneous rocks, also altered andesite and other porphyries locally called greenstone. The contacts between the greenstone, serpentine and sedimentaries have also a general strike northeast. All of these rocks have been sheared and altered as a result of later earth movements, some of which were a part of great mountain building processes. This movement produced many fissures, which were later filled by vein materials that include ores in many places. After this complex of sediments and igneous intrusives and extrusives took approximately its present position, erosion and sedimentation have materially modified its surface. Before the present gorges were cut out, streams flowed over the surface in positions differing somewhat from their present courses. Here and there streams deposited gravels which have not since been entirely removed by erosion, and form high-level placer deposits. These high-level gravels, as well as the present stream gravels, are fruitful of many placer deposits of the district.

LOWER APPLEGATE DISTRICT

In this report the Lower Applegate district includes all the territory in Josephine county which is drained by the Applegate river and its northward and southward flowing tributaries. It is limited on the north by the Grants Pass district of the Rogue river valley, on the east by the county line and the Upper Applegate district, on the south by the Waldo district, and on the west by the divide between the Rogue and Illinois rivers. It includes areas which have been called districts of the following names: Applegate, Davidson or Missouri Flat, Murphy, Oscar creek, Powell creek, Slate creek, Williamsburg

or Williams creek. The district is of irregular shape, but has a maximum length of about 20 miles east and west, and only slightly less north and south. In the region of Cheney creek and westward it is only 6 miles across, north and south. The district is very mountainous, but contains the northward sloping valley of Williams creek and the northwestward flowing Applegate river. The highest point in the district north of the river is at the top of Grants Pass peak, which is 3835 feet above sea level, but Mungers butte, south of the river, rises to more than 5200 feet, and several other peaks exceed 4500 feet in altitude. Williams creek valley varies from 1150 to 1650 feet in altitude, while the Applegate valley is between 900 and 1200 feet above sea level.

The annual rainfall of the district is about 35 inches. There is considerable snowfall in the higher elevations, while in the lower altitudes the snow rarely stays on the ground more than a few weeks. The ordinary daytime temperature in summer is between 75 and 90 degrees, while in the winter it varies from somewhat above freezing to 10 degrees above zero.

The district is served by the California and Oregon Coast railroad, which is projected from Grants Pass to Crescent City, California. The line has been completed and is in operation as far as Waters Creek station, 15 miles from Grants Pass. The district is also served by a good wagon road from Grants Pass through Waters Creek station to the Waldo district; also by good wagon road from Grants Pass to Murphy and up the Applegate and Williams creek. The section is well forested and is included in the Siskiyou National forest.

Mining began in the Lower Applegate district very soon after the discovery of gold on Josephine creek in 1852. The first mining in the district was probably in the gravels of Williams creek. But veins were discovered in Slate creek valley about 1860, and their exploration continued during that decade. However, the chief mining in the district continued to be confined to the placers all through the '70s. The Horsehead placer mine was the next important one on Williams creek in 1882; the following year it produced \$3000 in gold. The Watts placer near Murphy was also productive at about this time, while the Josephine mine on Slate creek was sold for \$3740 in 1882. The Mountain Lion mine near Davidson was discovered in 1889, and its development, with some output, continued during the next decade. Powell creek placers and the Rising Star quartz mine were productive in 1900. The next year the Savage and Mellen placer on Missouri Flat near Davidson was active and the Sunshine and Combination mines in the same region were developed soon afterward. In 1910 the Mountain Lion mine had 2000 feet of underground work and was equipped with a 5-stamp mill having electrolytic chlorination and amalgamation. Placer mining has continued on Williams creek, Oscar creek and elsewhere up to the present, but there is now very little activity in the deep mines of the district.

The rocks of the Lower Applegate district include argillites, sandstones, quartzites, limestones, marbles, greenstones, serpentine and tonalite, as well as alluvial deposits. The oldest rocks are Paleozoic sediments, including argillites, sandstones, limestones and some interbedded greenstones. The next younger series consists of argillites and sandstones of Jurassic age. The great tonalite intrusion probably came at the close of the Jurassic period; the only later rocks are the recent alluvial deposits.

Structurally, the Paleozoic and Jurassic sedimentary rocks have been tilted till they dip at high angles, and the Jurassic beds have even been overturned, according to Diller, so that while they dip eastward the overlying beds to the east are actually the oldest of the series. It seems probable to the writer that the Paleozoic rocks are also overturned so that the rocks at the eastern border of the district are the oldest rocks in the area. They consist of argillites, sandstones and interbedded andesitic greenstones, which may be provisionally assigned to the Silurian period. The next younger rocks are found at present under-

lying these to the westward; they include argillites, sandstones and lenses of limestone. These lenses contain some fossils by means of which the enclosing rocks on Powell and Oscar creeks have been referred to the Devonian by Diller. A similar series of rocks on Cheney creek, still farther west, has been referred provisionally to the same period (Devonian) by Diller, but it seems possible that it represents the Carboniferous, as fossils from this locality collected by the writer in 1913 are reported by the paleontologists of the U. S. Geological Survey to be "poorly preserved crinoid stems which indicate Paleozoic and probably Carboniferous age." In this region shales and argillites are abundant, and there are some greenstones.

The youngest consolidated sedimentary rocks are the argillites and sandstones in the Galice formation of the Jurassic period, which are found on Slate creek in the extreme western part of the Lower Applegate district. They are intimately associated with greenstones, which upon careful study are found to be andesite and diorite; some serpentine, derived from peridotite, is found in the same area.

If any rocks of the Cretaceous or Tertiary periods were deposited in this region they have been removed by later erosion so completely that no trace of them is now known. The latest rocks of the district are the unconsolidated gravels deposited by existing streams along their courses. These have been the scene of placer mining since the first days of gold mining in the state.

This district has abundant deposits of granite and marble; also some of the best and most extensive deposits of limestone in southern Oregon will be found in this section, in the neighborhood of Cheney creek and Williams creek. (For further details of these resources see Vol. 1, Nos. 5 and 7, Mineral Resources of Oregon.) Some good prospects of chromic iron ores are known in the serpentine areas of Slate creek.

WALDO DISTRICT

The Waldo district is in the southwest corner of Josephine county including all the area south of Kerby drained by the Illinois river and its tributaries. As thus defined, the district is bounded on the east by the Lower Applegate district; on the north by the Illinois river district; on the west by Curry county, and on the south by the California line. It includes districts described heretofore under the following names: Sucker creek, Brown-town, Althouse creek, Holland, Sailor Diggings, Takilma, Bollon creek, and Indian creek. The Waldo district is about 25 miles long east and west and about 15 miles wide north and south. It is a region of rugged mountains except on the western border where the Illinois river valley is relatively remarkably flat. The valley varies in elevation from 1400 to 1700 feet while the mountains reach elevations ranging from 4000 feet to considerably more than 6000 feet. In the eastern two-thirds of the district among the mountains the valleys are narrow and deep, though not like canyons.

The climate of the district is quite equable, the daytime temperature in the summer usually ranging from 60 to 80 degrees, and in the winter from above freezing to 10 degrees above zero.

The area is forested, especially in the higher elevations, being in the Siskiyou National Forest. The valleys contain a considerable area of excellent agricultural land. The principal towns are Kerby, Waldo, Takilma and Holland, which are reached by a good auto and wagon road from Grants Pass, 35 to 45 miles distant. The California and Oregon Coast railway, which is planned to connect Grants Pass with the harbor at Crescent City, will pass through the heart of this district. Fifteen miles of this road has already been completed from Grants Pass, the present terminus being Waters Creek station. The company plans to have this road completed as far as Waldo within the next year. This railroad will not only furnish transportation for

the Waldo district, but will afford a natural outlet for the mining transportation in other sections south and west from Waldo in California, where it is known that there are copper resources.

Mining began in the Waldo district in the spring of 1853 when a placer miners' "stampede" to Althouse creek occurred. At about the same time sailors are said to have abandoned a ship on the coast and traveled overland to the "Sailor Diggings" near Waldo where a ditch costing \$75,000 is reported to have paid for itself in one year. The gravels on Sucker creek were extensively mined from 1854 to 1860, though the results were not very satisfactory. In the latter year the Waldo copper mine was discovered by Mr. Hawes, and quartz veins on Althouse creek were opened soon afterward. The early work at the Waldo mine gave poor returns on account of the extremely high cost of transportation and materials. Work in the gravel of Scott's gulch near Waldo began in 1861 and continued for about 35 years. The Waldo Hydraulic Mining Company began work in 1877, and the ground is not yet exhausted. Simmons brothers opened the Deep Gravel mine more than 40 years ago; in 1878 Wimer and Sons bought a half interest, and in 1888 they secured the remaining half of the property. The Deep Gravel Mining Company became the owner in 1900, and later sold to the Waldo Consolidated Gold Mining Company. The chief mining activity in the district has been in the placers ever since mining began, these gravel deposits are still productive and give promise of continuing to yield for many years. In recent years the development of lode mining has progressed steadily. During the past year there has been a marked development in copper mining in this district, the important producers being the Queen of Bronze and Waldo mines. Chrome iron ore properties also have been important producers during the past year.

The Waldo district is occupied chiefly by old sedimentary rocks including argillites, quartzites, and limestones, and by dark colored subsiliceous igneous rocks, including andesite, serpentine, auganite, pyroxenite, etc. Smaller areas of other rocks are known, such as Cretaceous gravels and sands.

The oldest rocks known in the district are the Paleozoic argillites and limestones which occupy much of the mountainous portion, not only that drained westward to the Illinois river, but also that drained eastward to the Applegate river. In general, these rocks strike east of north and dip steeply eastward. They are interbedded with andesitic greenstones in many places. It has been suggested elsewhere in this report that they are overturned so that the oldest beds of the series are on the eastern border lying above the younger beds to the westward. The whole of the Paleozoic series lies above the still younger Galice formation of the Jurassic period near Waldo and Kerby; according to Diller the overlying position of the Paleozoic rocks is due to faulting in this locality. Andesites and basic igneous rocks largely altered to serpentine are associated with the argillites of the Galice formation.

Nowhere in the Waldo district are any intrusions of tonalite known, although some may exist in the mountainous portions which were seen only along a single rapid traverse.

Near Waldo there is still a small area of Cretaceous gravels and conglomerate, which has served as a source of placer gold. It lies unconformably above the Jurassic argillites; the latter are steeply inclined to the east while the Cretaceous gravels are nearly flat. On the basis of fossils these have been referred to the Horsetown formation of the Lower Cretaceous, or Comanchean. It is probable that these gravels were formerly much more widespread in this region than they are at present.

The youngest rocks in the Waldo district are the alluvial gravels still in process of formation by existing streams. In the mountainous portion of the district they are confined to very narrow strips along the water courses,

but in the Illinois river valley near Waldo they are somewhat more extensive.

The mineral resources of the Waldo district include copper, gold, silver, chromium, manganese and limestone. The gold and silver deposits occur both as placer and metalliferous quartz veins. Placer deposits have been worked successfully for 60 years and are still far from exhaustion. The development of quartz mining for gold and silver is not extensive in this section, although greater interest is shown in this kind of mining the last few years.

Chromite, the only important ore of chromium, occurs in quite pure masses in numerous sections of this district. It is usually closely associated with serpentine and the deposits found are more or less lens-shaped, varying in size from a few tons to thousands of tons. Several of these deposits in the district have been developed during the past year and approximately 2000 tons shipped to iron smelters in Chicago and Pennsylvania. There are numerous deposits of limestone in this district—one near Takilma on Elder creek, another 3 miles southeast of Kerby, and others in the eastern part of the district in the neighborhood of the Oregon caves. (For a more detailed description see Bulletin Nos. 5 and 7, Vol. I, Mineral Resources of Oregon.)

LAKE COUNTY

NEW PINE CREEK (Highgrade) DISTRICT and COYOTE HILL (Lost Cabin) DISTRICT

Nearly all the surface of Lake county is covered with either basaltic lavas or by lake and stream deposits. The few exceptions are: the locality south of Lakeview, east of New Pine creek station on the N. C. and O. railway, whose terminus is Lakeview, Oregon, the Coyote hills in T. 35 S., R. 23 E., Rabbit hills about 6 miles north of Coyote hills, Juniper mountain and Gray's butte near Alkali lake, Wagontire mountain north of Alkali lake and Horse mountain northwest of Alkali lake.

With the exception of Wagontire and Horse mountains, each one of these localities is much less than a township in extent. These outcrops, the most important of which are mentioned above, are older acidic effusives determined to be almost altogether andesites. The one or two areas which are known to contain gold and silver are those of New Pine creek and Coyote hills. Neither of these places have been visited and no reports by others are available. Such values as have been found are reported to be in oxidized ores in andesitic breccias. New Pine creek, or Highgrade district as it is sometimes called, is nearly all in Modoc county, California. Much prospecting has been done and one or more properties equipped with small plants working upon comparatively narrow veins of ore on which the returns in 1915 are nearly \$25 per ton for the few hundred tons treated. The Coyote hills, or what is sometimes known as Lost Cabin gold mining district, was brought to the notice of mining men in August, 1906, by the Loftus brothers. Nothing is known as to the developments in the last few years.

The soda works at Alkali lake have been equipped and are producing. Some development of the nitrate deposits of Wagontire mountain has been accomplished in 1916.

LANE COUNTY

BLUE RIVER DISTRICT

The Blue River district lies on the western slope of the Cascade range about 45 miles east of Eugene, and occupied the area drained by Blue river, a tributary of the McKenzie. The district therefore occupies a portion of the two counties Lane and Linn. The elevation of the district ranges from 1000 feet to nearly 4000 feet.

It has the characteristically mild climate of western Oregon, the annual rainfall being between 40 and 50 inches, most of which falls in the winter time. Snow usually covers the hills in this district for several weeks. The district is well forested being in the Cascade National Forest.

The nearest railroad station is Springfield on the Southern Pacific railroad. A good wagon road connects Springfield with Blue River postoffice on the McKenzie river at the southern border of the district. Trails are the only means of transportation in the district proper.

The rocks of this area are Cascades andesitic lavas and tuffs which make up the larger bulk of the Cascade Range. The ore deposits in the district are in silicified and mineralized fracture zones, more or less vertical in these andesites. The important ore minerals are pyrite, chalcopyrite, sphalerite and galenite. The veins strike north 60° to 80° W. and dip steeply to the southwest, being approximately parallel to those of the Bohemia region farther south. Considerable mining activity has been evidenced here for a number of years. Many properties have been worked. The district as a whole has not yet reached a steadily producing stage.

BOHEMIA DISTRICT

The Bohemia district is situated in the southern part of Lane county and lies on the crest of the Calapooya mountains, which forms the divide between the Willamette and the Umpqua rivers. The region is 30 miles southeast of Cottage Grove on the Southern Pacific railroad and may be reached by a branch railroad running to Disston, 12 miles from Cottage Grove, from which a good wagon road is built to the Champion mine in the heart of the district. There is also a good wagon road up Sharp's creek to Bohemia postoffice from a point a few miles below Disston.

The topography of the district is very rugged, the elevation varying from about 2000 feet in the bottom of the stream canyons to more than 6000 feet on some of the prominent peaks in the district. The hills are heavily forested due to the mild humid climate. The precipitation is about 50 inches annually, a large part of which falls in the winter time as snow that accumulates many feet deep for several weeks in the higher altitudes. The district is in the Umpqua National Forest.

The rocks of the district are Cascades andesitic lavas and tuffs which make up a large part of the Cascade Range. The ore deposits of the district are in silicified and mineralized fracture zones, cutting through these andesite lavas, having a general strike N. 60° to 80° W and dipping steeply to the S. W. The ore bodies vary from 1 to 10 feet in width, the principal ore minerals being pyrite, chalcopyrite, sphalerite and galena. The best developed mines of the district are the Champion, Musick and Bohemia. Mining activity has been in evidence in this district for more than 50 years, the most noted development taking place some 15 or 20 years ago. Considerable production has been reported from the district, which has been estimated at between \$300,000 and \$400,000, mostly in free gold. Owing to the difficulties in transportation, concentrates cannot be shipped with profit which run less than about \$25 a ton.

QUARTZVILLE DISTRICT

The Quartzville district lies on the western slope of the Cascade Range in the northeastern part of Linn county, and occupies the area drained by the Quartzville branch and the headwaters of the middle fork of the Santiam river.

The district is reached from Gates, a station on a branch of the Southern Pacific railroad, some 20 miles to the northwest. A wagon road was constructed from Gates to the district years ago but is not now passable. The

district can also be reached up the middle fork of the Santiam from Foster, where there is a fair wagon road for 12 or 15 miles.

The topography of the district is quite rugged, the elevation varying from about 1000 to more than 3000 feet. Owing to the mild and humid climate, the district is densely forested and lies within the Oregon National Forest.

The geology of the district is comparatively simple, the rocks being almost entirely flat-lying Cascades andesitic lavas and tuffs. In common with many of the other districts on the western slope of the Cascade Range, the ore deposits are in silicified and mineralized fracture zones cutting nearly vertically through these andesitic lavas. The minerals near the surface in these veins are largely free gold in iron-stained quartz and country rock. Some very excellent specimens of wire gold have been found in this section. Deeper down these minerals change to sulphides which are usually pyrite, chalcopyrite, sphalerite and galenite. The district has been a small producer for many years, one of the most persistent small producers being a property owned by Bob Monroe, who has been operating for a number of years, recovering gold from the oxidized portion of these veins with a small stamp mill.

LINN COUNTY

BLUE RIVER DISTRICT

See Blue River district, Lane county.

MALHEUR COUNTY

MORMON BASIN DISTRICT

See Mormon Basin district, Baker county.

MARION COUNTY

NORTH SANTIAM DISTRICT

The North Santiam district is situated on the western slope of the Cascade Range in the northern part of Marion county and occupies the area drained by the Little North Fork of the Santiam river. The district is reached by a fair wagon road from Gates, a station on a branch of the Southern Pacific railroad, some 12 miles to the southwest.

The topography is quite rugged, the elevation varying from less than 1000 feet to 3500 feet in the highest points. The climate is mild and humid, the daytime temperatures in summer varying from 60 to 80 degrees, and in the winter rarely going as low as zero. Snowfall is rather heavy and it is common for the snow to remain for several weeks in the winter.

The district is well forested and lies within the Oregon National Forest. Elk Horn postoffice is situated in the southwestern part.

The rocks of the district are almost entirely Cascades andesitic lavas and tuffs, which constitute a large volume of the Cascade Range. The ore deposits are in silicified and mineralized fracture zones cutting through the lavas and tuffs. These fracture zone veins vary from 1 to 6 or 8 feet in width, the principal ores being pyrite, chalcopyrite, sphalerite and galenite. Near the surface these minerals oxidize and the values are usually found as free gold in iron-stained quartz and country rock.

UNION COUNTY

CAMP CARSON DISTRICT

The Camp Carson district, near the headwaters of the Grande Ronde river, is reached by wagon road up that stream from La Grande, a distance of 45 miles, or from North Powder over a high pass, a distance of 28 miles. The elevation of the principal property, the Camp Carson mine, is about 6000 feet. This is a placer mine. In past years several quartz properties have

been developed in the upper Grande Ronde, but all of these have been practically abandoned or are idle.

This district, which is a well-timbered one, is north of the Granite and Rock creek districts and is on the northwestern extension of the Elkhorn range. Practically all of this wide area is granite except on much of the lower elevation where gravels or semi-consolidated sediments prevail. The deposit of chief interest, the Camp Carson mine, apparently must have been deposited by a drainage system entirely different from that of today. The gravels which were deposited in horizontal beds have since been tilted to an angle of more than 20 degrees. An interesting feature is that the gravels rest upon the granite which indicates that the granite was also involved in the tilting movement.

Production has been comparatively small and operations have been unsuccessful, apparently because of the cemented or semi-consolidated nature of the deposits, and because only a part of the values contained have been recovered by the standard methods now in use.

WALLOWA COUNTY WALLOWA DISTRICT

The mineral deposits of chief interest in the Wallowa district, although but a few miles from Cornucopia, are best approached from the north because high passes lie between. The branch line from La Grande runs down the Grande Ronde river a little east of north, most of the way through a productive agricultural valley. When it reaches the junction of the Wallowa river with the Grande Ronde it turns southeast and up the former through narrow defiles to enter soon, delightful Wallowa valley. The road and the river are at the foot of steep mountains on the right, while to the left stretching out in the distance is the valley and the slowly ascending hills.

Near the head of the valley at Joseph our railway journey ends. Located on wash from the terminal moraine at the lower end of Wallowa lake, only a mile away, the town is almost within the shadow of lofty mountains having no intervening foothills.

The district includes all of the drainage of the Wallowa river, south of Wallowa and including Lostine creek. On horseback from Joseph one travels up the east fork of Wallowa river, up the west fork and up Hurricane creek, each a separate journey, because no trails have been dug as yet along the barren ridges which separate these mountain streams. Above Joseph and the lake, out of the first pass to the left, flows the east fork of Wallowa river, and close to the right the west fork issues. Across the town one sees the way up Hurricane creek, while beyond the farthest mountain to the right the Lostine flows.

Wallowa lake is about 5 miles long, a mile wide, and in places is said to be 400 feet deep. It is the product of an immense flow of ice, which, coming down the forks of the Wallowa from the south, spread out as it emerged to be destroyed as it advanced, by the valley's warmer air. Its burden of stone brought down for tens of thousands of years built up the high ridges on the sides of the present lake and dammed it up at its foot. A warmer climate afterwards prevailing, the glacier melted away and Wallowa lake is there to take its place. Only incipient glaciers are found on the northern slopes of the higher peaks far back in the mountains to indicate how great a change has occurred. This is the greatest of all these glacial lakes, but throughout all the region smaller ones are there to fill the places where the streams of ice with tools of stone carved out great basins in the solid rock.

The region which we are to enter is on the northern side of the same intrusion seen at Cornucopia. Here its roof of sediments is all but gone,

and on its irregular sides schists and limestones expose their complex borders. Here and there on the broad expanse of the intrusion large isolated blocks of the ancient roof still remain. Water and ice has removed all but these and, laboring on, has scored deep valleys in the younger rock.

Where limestone is in roof or wall at the contact, copper and gold appear. In basic dikes copper and gold are also found, and where these products of the great intrusion cut the contacts, increased copper sulphides next to the dikes are found.

Along these contacts and in the basic dikes called lamprophyres, are the chief economic deposits. There has been but little development in the Wallowa region, and with the exception of test shipments it has no production.

WHEELER COUNTY SPANISH GULCH DISTRICT

This district is located in the southeastern corner of Wheeler county in T. 13 S., R. 25 E. Placer deposits have been worked since the first discovery of gold in Eastern Oregon, but the quartz ledges, some of which are quite wide, have not been developed or equipped for production. The district is located on Rock and Birch creeks, which flow north into the John Day river. The nearest store and postoffice is Antone, about 5 miles from the central part of the district. The active area is small and close to the main highway, or is reached by short branches therefrom, the greatest not over 4 miles long. Antone is about 60 miles west of Prairie City, the western terminus of the Sumpter Valley railroad, a narrow gauge line 80 miles from Baker. Antone is about 75 miles south from Condon, a branch line of the O.-W. R. & N. It is also about 60 miles southeast from Shaniko, on another branch of the O.-W. R. & N. With each of these railroad stations the district is connected by good wagon roads; that to Prairie City is entirely a water grade. The higher elevations in the district are well timbered. The lower half is covered with sagebrush.

Most of Wheeler county is covered by recent lavas. Spanish Gulch is a comparatively small area of the older rocks, which is probably entirely surrounded by these lavas. These older rocks are greenstones, argillites and serpentine which have been intruded by granodiorite porphyry and a complexity of dikes. Many of the veins are almost altogether massive quartz, while in others the vein material is highly altered and silicified country rock. The other minerals are pyrite, chalcopyrite and galena, containing gold and silver. In the vicinity of the serpentine areas chromite outcrops are found. The distance of this district from the railroad and from other mining camps has much to do with retarding what is apparently a promising field.

Index of mines, mining companies and prospects arranged alphabetically by counties and districts

BAKER COUNTY

Auburn District (see Baker District).		Annalulu Gold Mining Company.....	15
Baker District (includes Pocahontas, Auburn, Minersville)	248	Bald Mountain Mining Company.....	24
Baker and Herriman prospect.....	21	Bourne Gold Mining Company.....	40
Carpenter Hill mine.....	51	Buckeye mine (see (James B.) Sipe Mining Co.).	
Dale prospect	85	Climax mine	56
Hagelson prospect	115	Columbia Gold Mining Company.....	59
Herriman prospect (see Baker and Herriman prospect)	119	Columbia mine (see Columbia Gold Mining Co.).	
Kent mine	135	Cracker-Oregon mine	81
Nelson placers	161	E. and E. mine (see Bourne Gold Mining Co.).	
Sorbeck prospect	208	Golconda mine	100
Stub mine	214	Hemler claims	118
Yellowstone Mining Company.....	240	Ibex mine (part in Grant County)....	127
Young America prospect.....	241	Mammoth Mining Company.....	148
Cable Cove District (see also Grant County)	249	Mountain View mine.....	158
California mine	49	North Pole mine.....	165
Imperial mine	128	Sampson claims	195
Oregon Chief Gold Mining Company..	171	South Pole Consolidated Gold Mines Company	209
Conner Creek District.....	250	South Pole mine	209
Conner creek mines	68	Taber Fraction	220
Conner Creek Mining and Milling Company	68	Sipe Mining Company (James B.)....	204
Liddy group	140	Eagle Creek District (includes Paradise (Paddy creek) Copper Butte and Sanger Districts)	252
Runner claims (see Snake River Mines Co.).		Amalgamated Mines Company.....	14
Schist property (see Snake River Mines Co.).		Copper Butte group.....	71
Snake River Mines Company.....	207	Cox claim	82
Copper Butte District (see Eagle Creek District).		Dolly Varden	87
Cornucopia District	250	Eagle Creek Junction placer (see Hillsboro Gold Mining Co.).	
Baker Mines Company.....	21	Eagle Creek placers.....	88
Boulder Creek Mining Company.....	40	East Eagle Mining and Milling Company	88
Conundrum group	71	Forster and Thomas copper claims....	95
Cornucopia Mines Company of New York	74	Gilkeson claims	99
Elk Creek Gold Mining Company.....	90	Hillsboro Gold Mining Company.....	124
Jackley claims	133	McGee's claims	152
Jim Fisk mine.....	135	Miller and Lane group (see East Eagle Mining and Milling Co.).	
Last Chance mine (see Baker Mines Co.).		Paddy creek mine.....	177
Lindgreen claims (see Steen and Lindgreen claims)	141	Poorman group	181
Mayflower mine	151	Prince John Placer Mining Company..	184
Queen of the West Mines Company..	186	Sanger Gold Mines Company.....	196
Red Mountain prospect.....	191	Sheep Rock mine.....	200
Robert Emmett (see Elk Creek Gold Mining Co.).		Sovereign Consolidated Copper Company	209
Simmons prospect	203	Thomas copper claims (see Forster and Thomas copper claims).....	221
Smith's claims	207	Woodard group	239
Steen and Lindgren claims.....	213	Woodrow prospect	239
Underwood placers	225	Elkhorn District (see Rock Creek District).	
Union-Companion mine (see Cornucopia Mines Co.).		Gold Hill District (see Weatherby District).	
Valley View prospect.....	227	Greenhorn District (see also Grant County)	270
White Elephant prospect.....	235	Abel mine	7
Wild Irishman prospect.....	237	Banzette mine	25
Cracker Creek District (includes old Ibex District)	251		

Belmont mine	28	Gem Consolidated Gold Mining Com- pany	98
Bonanza mine	39	Iron Mask Copper Company.....	132
Diadem mine	86	Sumpter District	258
Don Juan	87	Buck Gulch mine.....	45
Gilkey and Kershaw (see Belmont mine).		Golden Chariot Mining and Milling Company	104
Golden Eagle Mining Company.....	105	Northwestern Smelting and Refining Company (see Sumpter smelter).	
Listen Lake Gold Mining Company....	141	Powder River Gold Dredging Company	183
Parkerville Diggings	178	Sumpter smelter	216
Phoenix mine	179	Weaver mine	233
Red Bird mine.....	187	Virtue District	259
Roberts group	194	Barry property (see Chicago-Virtue Mining and Development Co.).	
Snow Creek Mining Company.....	208	Brazos Mines Company.....	43
Spero mine (see Stevenson Mining Co.).		Chicago-Virtue Mining and Develop- ment Company	53
Stevenson Mining Company.....	214	Cliff mine	56
West Side Gold and Silver Mining Com- pany	235	Flagstaff mine	93
Whitney placer	237	Koehler antimony mine.....	137
Winterville and Parkerville Diggings..	238	Norwood mine (see Oregon Pittsburgh Mining Co.).	
Homestead (Iron Dyke) District (see also Wallowa County)	253	Oregon Pittsburgh Mining Company... 174	
Ballard group	24	Susan D. mine.....	218
Cap Miller group.....	51	Virtue Mines Development Company..	229
Cole claims	57	White Swan (see Susan D. mine).	
Farrell group	93	Weatherby District (includes Gold Hill District)	260
Gray Eagle group.....	110	Big Lode mine (see Hannibal Mining & Milling Co.).	
Hill claims	124	Burnt River Dredging Company.....	48
Homestead-Iron Dyke Mines Company	124	Conquest Gold Mining Company.....	69
Iron Dyke Copper Company.....	130	Free Gold group (see Oregon Free Gold Mining Co.).	
Koger group (see Snake River Mining and Milling Co.).		Gallagher group	97
MacDougall group (see also Wallowa County)	146	Gibbs property	99
McCarthy claims	152	Gleason's property	99
Rogers group	195	Gold Coin placer.....	102
Snow Creek Mining and Milling Com- pany	208	Gold Hill mine (see Conquest Gold Min- ing Co.).	
Ibex District (see Cracker Creek Dis- trict).		Gold Ridge mine.....	109
Iron Dyke District (see Homestead Dis- trict).		Hannibal Mining and Milling Company	116
Minersville District (see Baker District).		Little Hill property.....	142
Mormon Basin District (see also Malheur County)	255	Oregon Freegold Mining Company... 171	
Commercial Mining Company (see also Malheur County)	66	Pomeroy dredging ground (see Burnt River Dredging Co.).	
Giraffe Mining and Milling Company..	99	Scheelite property	199
Rainbow mine (see Commercial Mining Company).		Summit Mining Company.....	216
Paradise (Paddy creek) District (see Eagle Creek District).		Unclassified as to district.	
Pocahontas District (see Baker District).		Big Creek placers (see Hamm Gold Mining Co.).	
Rock Creek (Elkhorn) District.....	257	Cincinnati Mining Company.....	55
Baisley-Elkhorn mine	20	Co-operative Copper and Gold Mining Company	71
Highland Development Company.....	121	Cow Creek placers (see Hamm Gold Mining Co.).	
Highland mine	121	Hamm Gold Mining Company.....	116
Kelly mine	135	Oregon-Idaho Investment Company... 172	
Maxwell mine	150	Robert Emmett Company.....	194
Sanger District (see Eagle Creek Dis- trict).		Whited Mining Company.....	236
Sparta District	257		

CLACKAMAS COUNTY

Ogle Creek District.....	261	Ogle Mountain Mining Company.....	166
Clackamas Mining and Milling Com- pany	56	Unclassified as to district.	
		Sherwood Oil Company.....	201

CLATSOP COUNTY

Knappa Coal Company.....	137
--------------------------	-----

COOS COUNTY

Coos Bay District.....	262	Unclassified as to district.....	
Beaver Hill Coal Company.....	25	Big Hill Coal Mining Company.....	37
Coos Bay Coal and Fuel Co. (see Henryville mine).....		Coos Bay Oil and Gas Company.....	71
Henryville mine	119	Lampa Coal Mining Company.....	139
Libby mine	140	Lane Black Sand mines (see Noble Metals Extraction Co.).....	
Riverton mine	194	Noble Metals Extraction Company....	162
Smith & Powers mine (see Henryville mine).....		Salmon Mountain Coarse Gold Mining Company	197
Rock Creek District.....	263	Salmon Mountain mine.....	197
Copper King No. 1.....	72	Thompson mine	221
Rock Creek claims.....	194	West Shore Oil Company.....	235

CURRY COUNTY

Agness District	263	Thompson mine	221
Gold Bar mine.....	101	Tina H. mine (see Lucky Boy mine).....	
Iron Hill group.....	132	Winkle Bar	237
Night Hawk prospect.....	162	Ophir District	266
Pine Flat mine.....	180	Ainsworth claims (see Schulz & Ainsworth claims)	7
Stear property (see Stephens & Stear property)	213	Barr property (see Ink and Barr property)	25
Stephens and Stear property.....	213	Boulder Creek Gold Mining Company..	40
Cheteo (Mount Emily) District.....	165	Ink and Barr property.....	130
Florence prospect	94	Old diggings (see Boulder Creek Gold Mining Company).....	
Lucky Warren prospect.....	145	Schulz and Ainsworth claims.....	200
China Diggings District.....	264	Star mine (see Boulder Creek Gold Mining Company).....	
Anderson group (see Hustis and Anderson group)	15	Port Orford District	266
Bacon and Miller groups.....	19	Eekis (R. G.) mine (see Meek's mine).....	
Cheteo Copper Company.....	53	Meek's (Eekis) mine.....	152
Empire prospect	91	Sixes River District.....	267
Gold Basin placers.....	101	Blanco or Madden mine.....	34
Golden Dream claim.....	105	Byers and Hollenbeck claims.....	48
Higgins mine	120	Cape Blanco Ocean Beach mine.....	51
Hustis and Anderson group.....	126	Corbin property	73
Miller group (see Bacon and Miller groups)	153	Crawford and Fay claims.....	83
Collier Creek District.....	264	Divelbiss property (see Sixes Mining Company).....	
Berry's prospect	32	Fay claim (see Crawford and Fay claims)	93
Bonanza King	39	Guerin claim	115
Bunker Hill group.....	47	Hadley claims (see Wallace and Hadley claims)	115
Chromite deposit	54	Harrison claims	117
Collier Creek Copper Company.....	57	Hollenbeck claims (see Byers & Hollenbeck claims)	124
Curry Mining Company.....	84	Hydro Sixes Mines Company.....	126
Fry's property (see Kessler and Fry's)	97	Madden mine	147
Kessler and Fry's property.....	136	Platinum Iridium and Gold Company..	180
Elk River District.....	265	Robinson claim (see Smith and Robinson claims)	194
Axtell mine	18	Sixes Beach placer.....	205
Free Gold claim.....	96	Sixes Mining Company.....	205
Moss Rose group (see Axtell mine)....	156	Smith and Robinson claims.....	206
Gold Beach District.....	265	Wagner claim	230
Collins mine	58	Wall claims	231
Idaho mine	127	Wallace and Hadley claims.....	231
McKinley group (see Starr McKinley group).....		Way claims	233
Starr (McKinley group).....	211	Unclassified as to district.....	
Mule Creek District.....	266	Kalamazoo Ocean Beach mine.....	135
Battle Bar placers.....	25		
Cardwell claim	51		
Lucky Boy (Tina H.) mine.....	144		
Mule Mountain mines.....	159		
Paradise mine	177		
Red River Gold Mining and Milling Company	192		

CROOK COUNTY

Bear Creek Butte District.....	267	American Almaden Quicksilver and Gold Mining Company.....	14
Bolivar District (see Ochoco District).		Central Oregon Mining Company.....	53
Howard District (see Ochoco District).		Ophir Mayflower mine.....	167
Ochoco (Howard, Bolivar) District.....	267	Redmond District.....	268

DOUGLAS COUNTY

Drew Creek District.....	268	Unclassified as to district.	
Banfield mine	25	Banner Hill Mining Company.....	25
Rowley group (see Umpqua Copper Company).		Bonanza mine (see Sutherlin Quicksilver M. R. and D. Co.).	
Umpqua Copper Company.....	224	Casteel Mines Company.....	52
Green Mountain District.....	268	Oregon Mining and Power Company...	173
Green Mountain copper prospect.....	114	Sanford Placer Mines Company.....	198
Hydraulic Mines Development Company	126	Sutherlin Quicksilver Mining, Refining and Development Company.....	218
Riddle District	268	Umpqua Zinc Mining Company.....	225
Oregon Nickel Mining Company.....	173	Union Leader Mining Company.....	226

GRANT COUNTY

Cable Cove District (see also Baker County)	249	Zenith Mining Company.....	241
Last Chance mine.....	139	Greenhorn District (see also Baker County)	270
Mollie Gibson Gold Mining and Milling Company	154	Ben Harrison mine.....	29
Moon Anchor Mines Company.....	154	Bimetallic claims	37
Canyon District	269	Bright Carbonate Mining Company...	43
Canyon Mountain Mining Company...	50	Chloride mines	54
Chromite mines	54	Double Eagle Mining Company.....	87
Cinnabar deposits	55	Golden Gate Mining Company.....	106
Dan O'Shea claim.....	85	Hidden Treasure Gold Mining Company	119
Empire Gold Dredging and Mining Company	91	Intermountain claims	129
Great Northern mine.....	111	Intrinsic (see Bimetallic claims)	
Mountain View mine (see Canyon Mountain Mining Co.).		I. X. L. mine (see Hidden Treasure Gold Mining Co.).	
Oregon Asbestos mines.....	170	Morning mine	155
Oregon-Utah Mining Company.....	175	Morris mine	156
Cracker Creek District (see this district Baker County)	251	Olive Creek Mining Company.....	167
Ibex mine (part in Baker County)...	127	Ornament Gold and Silver Mining Company	176
Granite District	269	Psyche mine	184
Ajax mine	7	Richardson claims	193
Blue Bird mine.....	35	Royal White mine.....	195
Blue Ribbon mine.....	36	Ruby mine	196
Buffalo-Monitor mine	46	Spero mine (see Stevenson Mining Company).	
Cougar Gold Mining and Milling Company	81	Stevenson Mining Company.....	214
Cougar mine (see United Gold Mining Co.).		Tempest mine	221
Currey mine (see French Diggings).		Vincent Creek Gold and Copper Company	228
French Diggings	97	Virginia mine	229
Goddard-Hayes Mines Co. (see Magnolia mine).		West Side Gold and Silver Mining Company	235
Gold Bug Mining Company.....	102	New Eldorado District.....	271
Griffith mine	113	Butler Antimony claims.....	48
Independence mine	129	(Collin) Chisholm	54
LaBellevue mine	137	Heppner Mining Company.....	119
Magnolia mine	147	Krause claims	137
Monumental mine	154	Lemon's (Ira) prospect.....	140
North Fork mine.....	163	New Eldorado Mining and Reduction Company	161
Red Boy Mines Company	187	Pioneer mine (see New Eldorado Mining and Reduction Company).	
Red Boy Mining and Development Company	188	Wray claims	239
United Gold Mining Company.....	227	Quartzburg District	272
West placers	235	Colorado mine (see Equity Copper and Gold Mining Company).	

Comer Mines Company.....	66	Buck Gulch placer.....	45
Copperopolis mine	73	Chattanooga mine (see Northwestern Gold and Copper Company).....	68
Congar prospect	82	Compton mine	124
Dixie Creek placers.....	86	Homestake mine	152
Dixie Meadows mine.....	86	Mayflower mine	154
Equity Copper and Gold Mining Company	91	Monitor mine	164
Gauthier claims	98	North Gem mine.....	165
Keystone Mining and Milling Company	137	Northwestern Gold and Copper Company	168
Present Need mine (see Comer Mines Company).....	210	Ophir mine	182
Standard mine	272	Porphyry Hill claims.....	209
Susanville District	19	South Gem mine.....	214
Badger Gold Mining and Milling Company		Stockton mine	218
		Susanville placers	

HARNEY COUNTY

Harney District	273	Trout Creek Mining and Milling Company	224
Bullion Quartz mine (see Trout Creek Mining and Milling Company).....		Pueblo District	273

JACKSON COUNTY

Ashland District	273	Cook mine	71
Alton mine	14	Corporal G mine.....	81
Ashland Coal Mining Company.....	16	Coster and Catton's claim.....	81
Ashland mine	16	DeLuse Mining and Dredging Company	85
Barron mine	25	Dixie Queen mine.....	86
Beeson mine	27	Eagle mine	88
Bula mine	46	Fairview claim	92
Burdie mine	47	Glen Ditch mine.....	100
Cleveland claim	56	Gold Bank (see Gold Hill and Bohemia Mining Company).....	107
Columbine claim	65	Golden Standard Mining Company.....	108
Crackerjack claim	82	Gold Hill and Bohemia Mining Company	108
Forty-nine diggings	95	Gold Hill placers	109
Humdinger mine	125	Gold Hill "Pocket"	109
Lamb mine	138	Gold Hill Quartz Mining Company.....	109
Little Pittsburg mine.....	142	Gold Ridge mine	110
Mattern mine	150	Gray Eagle mine.....	110
Mundy mine	159	Hampson claims (see McLemore and Hampson claims)	116
Pilgrim claim	179	Harth & Ryan mine.....	117
Reeder mine	192	Hicks claim	119
Ruth mine	197	Highland claim	121
Shorty Hope Mining & Milling Company	201	Homestake mine	124
Snapshot claim	208	Kubli mine (Golden Standard Mining Company)	139
Star Gold Mining Company.....	211	Lance mine	139
Talent Coal Company.....	220	Last Chance mine.....	141
Elk Creek District.....	276	Liken's prospect	144
Buzzard mine (see Pearl Mining Company).....		Lucky Bart group.....	157
Lucky Jack Mining Company.....	145	May Belle claim.....	152
Pearl Mining Company.....	178	McLemore and Hampson's claims.....	152
Gold Hill District.....	276	McMahon's claim	153
Alice group	8	Millionaire mine	157
Bee Hive Mining Company.....	26	Mountain King mine.....	160
Bertha claim	32	Nellie Wright	179
Black Gold Channel mine.....	34	Perkeypile mine	
Blanche or May Belle claim.....	34	Red Oak mine (see Gold Hill and Bohemia Mining Company).....	193
Blossom mine	34	Revenue pocket	197
Big Buck or Hicks claim.....	36	Ryan mine (see Harth and Ryan mine).....	199
Bill Nye mine (see Bee Hive Mining Company).....		Schaffer claim	200
Bowden claim	40	Seventy-three Cinnabar group.....	219
Braden mine	41	Swacker Flat mine.....	219
Cartinell mine	51	Sylvanite	222
Catton's claim (see Coster and Catton's claim)	53		
Chisholm group	54		

Trust Buster mine.....	224	Garrison claims (see Edwards and Gar-	
Utah Quicksilver Company.....	227	rison claim).	
White Horse Mining Company.....	236	Grubstake mine	115
Whitney mine	236	Haskins and Traverso claim.....	117
Greenback District (see also Josephine		Johnston mine	135
County)	286	Layton mine	139
Copper King mine (see United Copper		Lone Pine mine.....	143
Company).		Maid of the Mist mine.....	148
Gold Note mine.....	109	Moses and Collins claims.....	156
Lucky Tovell	145	Myer (see Wright and Myer claim)..	159
United Copper Company.....	226	None Such mine.....	162
Jacksonville District	278	Oregon Belle mine.....	170
Cascade Coal mine.....	52	Pearce mine	178
Gold Standard Mining Company.....	110	Queen Anne mine.....	184
Green mine	114	Schwartzfader claim	200
Hansen Coal mine.....	116	Senora (El) Mining Company (see El	
Jacksonville Mining and Milling Com-		Senora Mining Company).	
pany	133	Spaulding mine	209
Jacksonville placer	133	Steamboat pocket	212
Medford Mining and Milling Company		Sterling Gold Quartz Mining and Mill-	
(see Norling mine).		ing Company	213
Norling mine	162	Sterling mine	214
Opp mine	168	Sterling Mining Company.....	214
Sunnyside coal mine.....	216	Sturgis mine	214
Sykes Creek Mining Company.....	219	Traverso claim (see Haskins and Tra-	
Town mine	222	verso claims)	223
Yellow King mine.....	240	Vance Mining Company (see Sturgis	
Upper Applegate District.....	280	mine).	
Afterthought mine	7	Wagner claim	230
Blue Ledge mine (in California).....	35	Wright mine	240
Branter mine	43	Wright and Myer claim.....	240
Collins claims (see Moses and Collins		Unclassified as to district.	
claims)	58	Altan Mining Company.....	14
Edwards and Garrison claim.....	89	Forest Creek Mining Company.....	95
El Senora Mining Company.....	90	Platinum, Iridium and Gold Company..	180

JEFFERSON COUNTY

Ashwood (Trout Creek) District.....	282	Trout Creek District (see Ashwood Dis-	
Oregon King mine.....	172	trict).	
Roy Mining Company.....	196	Unclassified as to district.	
		Nickel Mines and Smelting Company..	162

JOSEPHINE COUNTY

Galice District	282	Highland Improvement Company (see	
Akron Gold Mining and Milling Com-		Black Bear mine).	
pany (see Keystone group).		Jewell and Lewis placer.....	133
Alameda Consolidated Mines Company..	8	Keystone group	136
Alameda Mines Company	13	Kramer group (see Elwilda group)...	137
Alameda mine	8	Lewis placer (see Jewell and Lewis)..	140
Argo group	15	Marvin mine	149
Bailey Gulch Mining and Milling Com-		Mayflower group	151
pany	20	Mt. Reuben Mining Company.....	158
Benton group	28	Nesbit group	161
Black Bear mine.....	33	Old Channel Hydraulic Mining Com-	
Black Jack property.....	34	pany	166
Bradbury mine	41	Old Glory Gold Mining Company....	167
Buffalo group	44	Oriole Gold Mining Company.....	175
Carlton group	51	Richmond Gold Mining Company.....	193
Cold Spring mine.....	57	Rock Gulch placer.....	195
Copper Eagle mine	72	Scandinavian American Company....	199
Copper Stain	73	Seven-thirty mine	200
Elwilda or Kramer group.....	90	Sordy's claim	209
Friday group (see Richmond Gold Min-		Spokane group	210
ing Company).		Sugar Pine mine	215
Galice Consolidated Mines Company..	97	Sugar Pine Mining Company	216
Gold Bug mine.....	102	Texas-Oregon Power and Placer Min-	
Golden Wedge mine.....	107	ing Company	221
Hell Gate Mining and Development		Three Lodes Mining Company.....	222
Company	118	Treasury group	223

Tyee Bar placer mine.....	224	Chatty mine	53
Victor mine	228	Cobalt group	57
Grants Pass District.....	284	Eureka mine	92
Baby mine	18	Freehold Mining Syndicate.....	97
Big Four placer.....	36	Gold Ridge prospects.....	110
Billie Blue mine.....	37	McPherson (see Winters and McPherson property)	152
Cook and Howland mine (see Hydraulic Mining Company).....		Mood mine	155
County Line mine.....	82	Neil mine	160
Cramer prospect	83	United Copper Gold Mines Company..	226
Daisy mine	84	Williams and Adylott mine.....	237
Dick mine	86	Winters and McPherson prospects....	238
Dry Diggings	88	Lower Applegate District.....	288
Eagle mine	88	Arrowhead mine	15
Emerson placer (see Flanagan and Emerson placer)	91	Bone of Contention mine.....	39
Flanagan and Emerson placer.....	94	Buckeye mine	45
Gold Drift mine.....	104	Exchequer mine	92
Gopher mine	110	Goleonda mine	100
Granite Hill mine (see Oregon Gold Mines Company).....		Humdinger mine	125
Hammersley mine (gold) (see Daisy mine)	116	Ingram claims	129
Hammersley mine (chrome).....	116	Jewell and Moore group (see Oscar Creek Consolidated Mining Company).....	
Hydraulic Mining Company.....	126	Michigan mine (see Oregon Strong Ledge Mining Company).....	
Ida claim	127	Mountain Lion mine	157
Jewett mine	134	Oregon Bonanza mine	170
Lucky Queen mine.....	145	Oregon Strong Ledge Mining Company	174
May Queen mine.....	152	Oscar Creek Consolidated Mining Company	177
Mountain Treasure Mining Company..	157	Queen mine	184
Mount Pitt mine.....	158	Ramsey mine	187
Oak mine	165	Rising Star mine.....	193
Oregon Gold Mines Company.....	171	Waldo District	290
Oro Fino mine.....	176	Brooklyn mine	44
Red Jacket claim.....	191	Cameron mine (see Logan, Simmons and Cameron)	49
Swastika Mining Company.....	219	Camp Bird claim.....	49
Ten Spot claim.....	221	Coad placer (see National Copper Mines Company).....	
Greenback District (see also Jackson County)	286	Continental mine (see Copper Mountain Mining Company).....	
Columbia Mines Company.....	65	Copper Mountain Mining Company....	72
Copper Queen mine.....	73	Copper King mine (see Mable mine).....	
Dorothea mine	87	Cowboy mine	82
Glendale Mining and Milling Company	100	Daisy Mining Company.....	84
Gold Coin mine.....	103	Deep Gravel Mining Company.....	85
Greenback mine	112	Ducommun (see Elephant property)...	88
Jim Blaine mine.....	134	Elephant or Ducommun property.....	90
Martha mine	149	Fidelity group (see Roseburg and Fidelity group)	93
Marshall mine (see Glendale Mining and Milling Company).....		Free and Easy mine.....	96
Minnehaha Gold Hydraulic and Dredge Company	153	Gates claims (see Tomlinson, Gates and Thomas claims)	98
Oregon Manganese Company.....	173	Goleonda mine	100
Payne's mine	178	Gold and Platinum Mines Company...	101
Silent Friend mine.....	202	Gold Bar (see National Copper Mines Company).....	
Star mine	211	Gold Pick (see Brooklyn mine).....	
Steam Beer mine.....	212	Grand Prize Hydraulic Mines.....	109
Wolf Creek Mining and Development Company	239	Grey Eagle mine (in California).....	113
Yellowhorn mine	240	Hidden Treasure Mining Company...	120
Illinois River District.....	288	High Gravel mine.....	120
Adylott mine (see Williams and Adylott)	7	Horse Shoe property.....	124
Alta mine	14	January First mine.....	133
Anderson prospect	15	Kerby Queen or (Sowell) mine.....	136
Black Bear claim.....	32	Little Gem mine.....	142
Bowden prospect	41	Logan, Simmons and Cameron mine...	143
Calumet mine	49	Lucky Seven Mining Company.....	145
Canyon Creek Consolidated gold Mines Company	50	Lytle mine	145
Casey prospect	52		

Mabel mine	145	Waldo mine	230
National Copper Mines Company.....	160	Waldo Smelting and Mining Company. 231	
Osgood mine	177	Unclassified as to district.	
Portland group	182	Little Meadows Placer Mining Company 142	
Queen of Bronze mine.....	184	Lucky Dog Mining Company.....	144
Reynolds mine	193	Oregon Placer Company.....	174
Roseburg and Fidelity group.....	195	Panther Creek Mining Company.....	177
Segno-Tomek Company (see Neil mine).		Phillips or Vanguard property.....	179
Simmons (see Logan, Simmons and		Sarah-Belle Mining Company.....	199
Cameron mine)	203	Tennessee Bar (see Little Meadows	
Sowell mine (see Kerby Queen mine..	209	Placer Mining Company).	
Spence mine	209	Tri-Metal Mining Company.....	224
Surprise Mining Company.....	218	Vanguard (see Phillips or Vanguard	
Takilma Smelting Company.....	220	property)	227
Thomas claims (see Tomlinson, Gates		Waldo corporation	230
and Thomas claims)	221	Welcome mine (see Lucky Dog Mining	
Tomlinson, Gates and Thomas claims..	222	Company).	

LAKE COUNTY

Unclassified as to district.		New Pine Creek (High Grade) District..	292
Royal Duke Mining Company.....	195	Coyote Hills (Lost Cabin) District.....	292

LANE COUNTY

Blue River District (see also Linn Coun- ty)	292	Gilbertson's property	99
Calapooia and Blue River Mill and Min- ing Company	48	Golden Rule Consolidated Mining & Milling Company	107
Consolidated Lucky Boy Mines Com- pany	69	Green Rock Mining Company.....	114
Great Western Mining and Milling Company	112	Grizzly Mountain Mining and Reduc- tion Company	115
Lane County Mining Company.....	139	Helena mine (see West Coast Mines Company).	
Lucky Boy (see Consolidated Lucky Boy Mines Company).		Kelso Gold Mining and Milling Com- pany	135
Merger Gold Mining Company.....	153	Musick mine (see West Coast Mines Company).	
Bohemia District	293	North Fairview mine	163
Baltimore Gold Mining Company.....	24	North Fairview Mining Company	163
Champion mine (see West Coast Mines Company).		Oregon Mines Corporation.....	173
Churchill property	55	Vesuvius Mines Company.....	227
Crater Gold and Copper Mining Com- pany	83	West Coast Mines Company.....	234
Combination Mines Company.....	65	Unclassified as to district.	
		Black Butte Quicksilver Mining Com- pany	33

LINN COUNTY

Blue River District (see also Lane Coun- ty)	292	Quartzville District (Third Santiam Dis- trict)	293
Blue Bird Mining Company.....	35	Advance Mining and Milling Company	7
Cinderella Mining Company.....	55	Albany mine (see Lincoln Mines Com- pany).	
Great Eastern mine (see Cinderella Mining Company).		Lincoln Mines Company.....	141
Great Northern mine.....	112	Paymaster Mining and Milling Com- pany	178
Pooler's property	180	Third Santiam District (see Quartzville District).	
Treasure mine	224		

MALHEUR COUNTY

Mormon Basin District (see also Baker County)	255	Rainbow mine (see Commercial Min- ing Company).	
Cleveland Development Company.....	56	Unclassified as to district.	
Commercial Mining Company (part in Baker County)	66	Baker and Malheur Oil Company.....	21
Humboldt Consolidated Gold Mines..	124	Great Western Oil Company.....	112
Humboldt mine	125	Hutchinson Oil and Gas Company.....	126
		Willow Creek placer.....	237

MARION COUNTY

North Santiam District.....	294	Gold Creek Mining and Milling Com- pany	104
Black Eagle Mining and Milling Com- pany	33	Ideal Mining Company.....	127
Consolidated Copper Mining and Power Company	69	Lewis and Clark Mining and Milling Company	140
Crown Mining and Milling Company..	83	North Santiam Mining Company.....	165
Electric Mining and Smelting Company	89	Silver King Mining Company.....	202
Freeland Consolidated Mining Company	97	Sunnyside Mining and Milling Company	217

UNION COUNTY

Camp Carson District.....	294	Unclassified as to district.	
Camp Carson mine	49	Eclipse Copper Mining Company.....	89
Camp Carson Mining and Power Com- pany	50		

WALLOWA COUNTY

Homestead (Iron Dyke) District (see also Baker County)	253	Manuel Lopez claims.....	149
Brooklyn group	44	Mountain Gem Mining and Develop- ment Company	156
MacDougall group (see also Baker County)	146	Peacock mine	178
Iron Dyke (see Homestead District).		Walla Walla group.....	231
Wallowa District	295	Wallowa County Mining and Develop- ment Company	232
Contact Mining and Milling Company..	70	Williams mine (see Wallowa County Mining and Development Company).	
Donnelly prospect	87	Unclassified as to district.	
Frasier mines	95	Electrolytic mine	88
Gem mine (see Mountain Gem Mining and Development Company).		Eureka Mining, Smelting and Power Company	92
Gyllenberg claim (see Hecla Consoli- dated Mining Company).		Imnaha mine	128
Heaverne group	117	Scholl's prospect	200
Hecla Consolidated Mining Company..	118	Winchester mine (see Imnaha mine).	
La Gore group.....	138		

WASCO COUNTY

Unclassified as to district.	
Beavis May Oil Company.....	26

WHEELER COUNTY

Spanish Gulch District.....	296	Sand Gulch Mining Company.....	198
Birch Creek Mining property.....	38	Waterman property	232

UNCLASSIFIED

American Exploration Company.....	15	Munitalp Mines Corporation.....	159
Anhydrous Mines Company.....	15	Oregon Gold Prospecting and Promoting Company	172
Billy Creek Mining Company.....	37	Oregon-Idaho leases	172
California Consolidated Mines Company..	48	Oregon-Montana Mining, Milling and Manufacturing Company.....	173
Canyonville Mining Company.....	51	Oregon Oil Company.....	174
Central Oregon Oil and Gas Company....	53	Park Mining Company.....	178
Douglas Umpqua Mining Company.....	87	Pittsburg Development Company.....	180
Drexel Mining Company.....	87	Platina y Oro Mining Company.....	180
Glade Consolidated Gold Mining Com- pany, Ltd.	99	Pocahontas Mining and Irrigation Com- pany	180
Gold Beach Metal Company.....	101	Salinore Mines and Power Company....	199
Greenback Mines Company.....	114	Western Metal Mines Company.....	234
Isis Oil and Gas Company.....	133	Wilson Basin Mining and Development Company	237
Long Placer Mining Company.....	143		
Midway Oil Company.....	153		
Morrison Smith Mining Company.....	156		

OREGON CORPORATIONS WHOSE PROPERTIES ARE WITHOUT THE STATE

Alaska Coal Oil Company (Alaska).....	8	Lucky Four Mining Company (Idaho)..	144
Alaska Douglas Gold Mining Company (Alaska)	8	Mashell Coal and Coke Company (Wash- ington)	150
Alps Mining Company (Nevada).....	13	Mastodon Hydraulic Mining Company (Alaska)	150
Brierhill Coal and Coke Company (Wash- ington)	43	Mt. Baker Mining Company (Washing- ton)	158
Bullion Mountain Mining Company (Cal- ifornia)	47	Mt. Shasta Mining Company (California)	158
Bunker Hill and Sullivan Mining and Concentrating Company (Idaho).....	47	Mt. St. Helens Consolidated Mining Com- pany (Washington)	158
Coeur d'Alene Development Company (Idaho)	57	Nancy Donaldson Mining Company (Ne- vada)	159
Columbia Coal and Coke Company (Wash- ington)	58	National Copper Mines Company (Idaho)	166
Devil's Gate Mining Company (Califor- nia)	85	Nay Aug Idaho Mines Company (Idaho)	160
Essex Lead and Silver Mining Company (Idaho)	92	Oregon and British Columbia Mining and Developing Company (Canada).....	171
Eureka District Gold Mining Company (Washington)	92	Portoma Mining Company (Idaho).....	182
Fidelity Copper Company (Idaho).....	93	Prince Extension Mining Company (Ne- vada)	183
Field Mutual Mining Company (Idaho)..	93	Retallac Mining Company (Idaho).....	192
Garachine Oil Company (Panama).....	98	Rossland and Deer Park Mining Company (Alaska)	195
Golden Gate Placer Mines (Idaho).....	106	Sierra Nevada Consolidated Mining Com- pany (Idaho)	202
Golden Glow Mining Company (Idaho) ..	106	Stella Coal Mining Company (Washing- ton)	213
Hamilton Mining Company (Idaho).....	116	Sullivan Extension Mining Company (Idaho)	216
Highland Surprise Consolidated Mining Company (Idaho)	122	Tepustete Iron Company (Mexico).....	221
Idaho Copper Mining Company (Idaho)..	127	Victoria Mining Company (Mexico).....	228
Ladd Metals Company (Idaho).....	138	Watkins Coal Company (Washington)...	233
Lilly M. Mining and Development Com- pany (Alaska)	141	Western Consolidated Mines Company (California)	233