

Bulletin No. 17

EARL K. NIXON
DIRECTOR

FOREWORD

This is the first inventory that has been made of manganese deposits in Oregon. As there is no production of this mineral in the State in normal times due to the small size or low grade of known deposits, the work of making a manganese survey has been postponed until now in deference to studies of ores and minerals in active production or seeming to promise early activity.

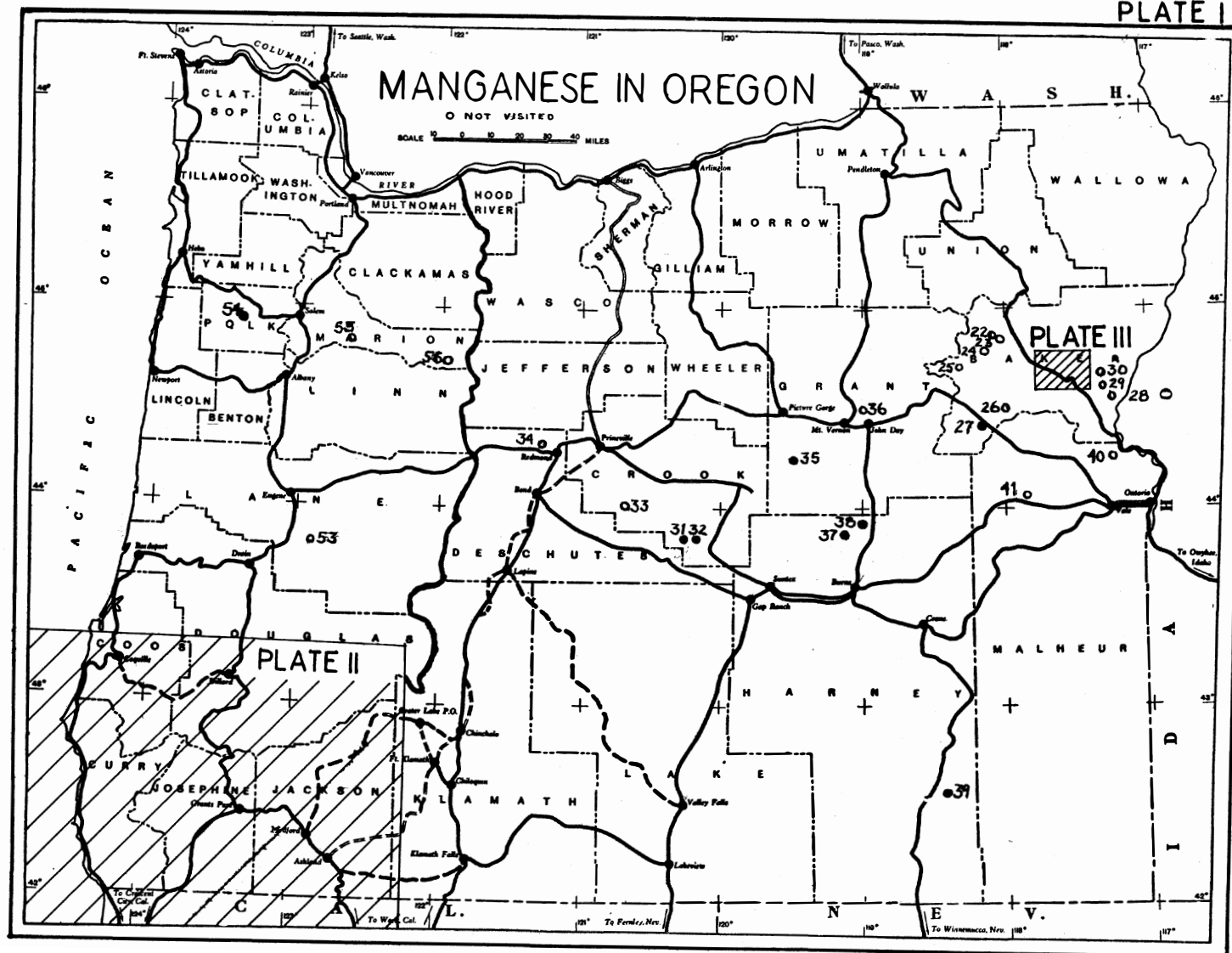
When it became evident more than a year ago that a shortage of manganese would develop in the United States, the Department of Geology and Mineral Industries initiated a survey of all the known deposits of that ore existing in the State.

Over fifty manganese occurrences and deposits in southwestern Oregon were visited during 1940 and early 1941 by Ray C. Treasher, field geologist. Thirty others in eastern Oregon were visited in 1938, 1939, and 1940 by John Eliot Allen, geologist, and Hugh K. Lancaster, field engineer.

Attempts have been made to evaluate the deposits, not only with regard to a normal price and economy (most of them have no demonstrated value under these conditions) but also under conditions brought on by wartime scarcities with consequent rise in price and demand. It may be that heretofore worthless, low-grade ores soon can be beneficiated and used.

Earl K. Nixon, Director

Portland, Oregon,
October, 1941.



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II. INTRODUCTION

Method of Study

Manganese occurrences mentioned in available reports were visited by members of the Department staff whenever the report suggested a possibility of the existence of a commercial deposit. Numerous other prospects and properties brought to the attention of the Department were visited and examined in such detail as the deposit seemed to warrant. Samples were taken for assay from all properties visited.

Included in the report is a tabulation of all other assays of samples of manganese ores submitted to the State laboratories.

Acknowledgements

The authors wish to express sincere thanks for the whole-hearted cooperation of the many property owners and prospectors who acted as guides and furnished helpful information in the field investigations.

In 1917 and 1918 J. T. Pardee, assisted by E. S. Larson, visited and reported upon some 17 manganese occurrences in the State. The report (Pardee 21), published by the U. S. Geological Survey, has been freely used in this investigation and has been of great assistance. In 1936 a survey of certain manganese deposits of southwestern Oregon was made by geologists of the U. S. Engineers under the direction of Edwin T. Hodge. This report (Hodge 37) has been helpful in providing additional information on southwestern Oregon deposits. Especial mention should be made of the assistance rendered by Francis G. Wells and assistants of the U. S. Geological Survey, whose published maps (Wells, 39 and Wells, 40) have been used in identification of geological formations in southwestern Oregon.

III MANGANESE ORES AND ECONOMICS

by

J.E. Allen F.W. Libbey

Mineralogy

There are 119 minerals listed in Dana's "Textbook of Mineralogy" as containing manganese. Of these minerals, however, only a very few form bodies of economic importance. A large part of the manganese actually being mined in the world today consists of one or both of the two oxides, psilomelane and pyrolusite; rhodochrosite, the carbonate, however, is an important manganese ore in Montana.

PSILOMELANE:

- Composition: Of uncertain composition but essentially MnO_2 and $BaMnO_3$ with some combined water and usually contains small amounts of iron and tungsten. Manganese content is 49-62%.
- Structure: Amorphous, compact massive to earthy, commonly rounded or botryoidal and stalactitic.
- Physical Properties: Distinguished from other manganese oxides by its hardness, which is 5 to 6 depending on its purity. Earthy, sub-metallic to dull lustre. Black to brown color and streak. Fracture, conchoidal, if any. Specific gravity, 3.7 to 4.7, depending on its purity.
- Occurrence: Usually an alteration product or secondary mineral, occurring in residual clays or bog deposits. It is nearly always the result of concentration from other more sparsely disseminated manganese minerals.

PYROLUSITE:

- Composition: MnO_2 (with some impurities) containing 63.2% manganese when pure. Commonly contains a little water, silica, lime, iron, or barite.
- Structure: Usually granular massive, reniform and botryoidal, occasionally with radiating columnar to fibrous structure. It is also found in "sooty" powder form or in small grains.
- Physical Properties: Hardness, 2-2.5. So soft that it usually soils the fingers. Metallic to dull earthy lustre. Iron black color and streak. Splintery fracture. Specific gravity, 4.75 to 4.86.
- Occurrence: Usually a secondary mineral, although primary in sediments. Nodular deposits are found on the sea bottom, in tuffs, breccias, etc. Replaces such minerals as rhodochrosite, rhodonite, braunite, hausmannite, psilomelane, manganite, and manganosite. Found as secondary mineral in cherts in Oregon and California.

Pyrolusite and psilomelane are found usually in irregular masses, or in beds of varying thickness or purity, but they are also found in veins, breccia, and as nodules in limestones and other rocks.

RHODONITE:

- Composition: $MnSiO_3$. Iron, calcium, and sometimes zinc replace a part of the manganese. Manganese content about 40%.
- Structure Usually in compact but easily cleavable masses and as embedded disseminated grains. Crystals rough with rounded edges.
- Physical Properties: Hardness, 5.5 to 6.5. Brittle. Vitreous lustre. Color pink to rose, red to brown, usually stained black on cleavage cracks

by manganese oxide alteration products. Streak white. Good cleavage. Specific gravity, 3.4 to 3.7. Not affected by acid.

Occurrence: Rhodonite occurs in primary veins and frequently as an original constituent of banded cherts of the Franciscan rocks of Oregon and California. In deposits of this type which have been worked, there has been sufficient alteration of the original silicate to convert it to manganese oxide.

RHODOCHROSITE is a pink manganese carbonate (47% manganese); a primary mineral which may be differentiated from rhodonite by its rhomboidal cleavage, lesser hardness (3-4), and it's effervescent in hydrochloric acid. It is mined in Montana.

Other minerals that have been mined sporadically for manganese are HAUSMANNITE (San Luis Obispo County, California and Olympic Peninsula, Washington), MANGANITE (Montana, Utah), and WAD which is an earthy mixture of several oxide minerals.

Paragenesis

According to Hewett (38:488), in most places manganese silicates, carbonates, and sulphides were deposited by hot waters near fractures and fissures in either consolidated sedimentary rocks or igneous rocks. Under the influence of recent weathering processes these minerals have been more or less widely altered to the oxides and hydrous oxides. Only rarely in Western America have manganese oxides been shown to have been laid down originally as part of the sedimentary series. In the chert zones of the Franciscan formation of California and southwestern Oregon, the lenticular bodies of manganese oxides found parallel to the bedding of the chert have been shown to have originated by the alteration of original sedimentary manganese carbonate (rhodochrosite), first to silicate (hausmannite, bementite, neotocite, etc.) then through weathering to the common manganese oxides.

Prospecting For Manganese

Manganese deposits have no distinctive rock associations. Since most occurrences of manganese mineral likely to come to the attention of a prospector are secondary in origin, no particular host rock is required. In Oregon, manganese is found in various rocks, such as chert, argillite, schist, andesite, and tuff.

Descriptions of the common manganese minerals, including identifying characteristics, are given on previous pages. One misleading characteristic of manganese oxide minerals especially if they occur in a dark colored rock, is their pervasive nature. Manganese oxides may deposit along joint and cleavage planes of rock and form a thin black film. Thus, while apparently broken pieces are all manganese oxide, in reality the oxide is on the outside only and is a very small percentage of the whole. In such cases the weight or "heft" of such stained rock will usually serve to distinguish them. Solid manganese oxide has a specific gravity at least 50 per cent greater than the silicate rocks likely to be stained.

Rhodochrosite and rhodonite are two manganese minerals, often pink colored, which may be confused since they are similar in appearance; the former, however, if it occurs in a deposit of sufficiently large size, could be a commercial ore; while rhodonite, at least under present conditions, is not economic as an ore of manganese. Difference in hardness and the action of acid on rhodochrosite as outlined above will serve to distinguish the two minerals.

Following the discovery of mineral of commercial grade it is necessary to obtain as much information as possible concerning the extent and value of the

deposit. Rarely is a body of ore naturally exposed so that it may be sampled and its size estimated without doing exploratory work. Usually overburden covers practically all of the surface outcrops. Sometimes it is necessary to trace pieces of float to their source. In most cases considerable digging is essential to show up a deposit so it may be sampled over its full width. Manganese minerals may be erratic in distribution and usually it is not possible from one exposure to judge of possible tonnage available. Such knowledge of tonnage is necessary before much in the way of expenditure is warranted. Therefore, the outcrop should be exposed in as many places and in such extent as is feasible. Usually systematic development work, even if warranted, is beyond the financial ability of the prospector.

In order to determine the value of a deposit the exposure must be sampled accurately. Methods of sampling would vary according to the deposit, and only generalized directions for sampling may be given. Sampling for the purpose of evaluation is within the province of the examining mining engineer, but it is possible for a prospector, by careful sampling, to obtain information which will enable him to determine whether or not his deposit is commercial and to select the portions which may be shipped profitably.

Careful channel samples should be taken to determine the average mineable grade of the deposit. In the case of manganese, hand-sorting may be required in order to obtain a shipping grade. Therefore, it is often desirable, in addition to channel sampling, to hand-sort a pile of ore broken from an exposure. A record of weights of both the hand-sorted grade and that thrown in the discards should be kept and assays obtained from both portions. Thus it may be determined in what measure hand-sorting is desirable. Channel samples should be cut at right angles to the walls of the bed or vein. In soft ore a pick may be used, but when the ore is hard, as is generally the case, moils and 4-pound hammer are required. A channel should be about four inches in width and one to two inches in depth and uniform over the entire length of samples. If the exposure is five feet thick, measured from wall to wall, the channel would then be five feet long and the sample should weigh at least fifteen pounds. Often an exposure is such that parts of it vary in character. In such cases, it generally is desirable to take separate samples of the different varieties of ore exposed. Thus, if an exposure showed ore of a certain character two feet thick along one wall with an obviously lower or higher grade of ore four feet thick adjoining it, two samples should be taken, one over a width of two feet, the other over a width of four feet, it may be necessary to sample an exposure in several sections, always keeping an accurate record of the widths of the various sections. It is seldom desirable to take a channel sample over a length greater than five feet, even if an exposure more than five feet in thickness shows no variation in character. Thus an ore exposure of uniform appearance, ten feet in thickness, would be separated preferably into two five foot-sections for sampling.

Unless an assay laboratory is close to the deposit, channel samples may be (and usually are) too heavy to transport without reduction in quantity. Such samples should be crushed by such means as are available and to as small size as is feasible. They should then be reduced in quantity so that each final sample is an exact average of the one originally taken. The crushed sample should be thoroughly mixed either by pouring from one receptacle (such as a powder box) to another, or by rolling on canvas. The thoroughly mixed, crushed material in the form of a cone is then flattened from the center outward, and quarters formed by drawing two lines at right angles through the center with a shovel or other tool. Opposite quarters are saved and the remainder discarded. If necessary, the operation may be repeated until the final sample weighs seven to ten pounds, which is

a convenient size to send to an assay office. Especial care must be taken in mixing the sample so that the proper proportions of fines and coarse is obtained. In cutting the channel without due care, too large a proportion of the more easily cut soft material may be obtained; too great a proportion of the fines might serve to "salt" the sample.

Various rules have been made which govern the allowable maximum size of particle to which a sample should be crushed for a given weight of sample before the sample may be safely reduced in quantity. Such rules would not be practical of application for the prospector.

Manganese assays are reported as metallic manganese (Mn) for metallurgical manganese and as manganese dioxide (MnO_2) for chemical or refractory ore. The percentage of manganese in manganese dioxide may be obtained by multiplying the percentage of manganese dioxide reported by 63. Thus, 70 per cent MnO_2 equals 44 per cent Mn.

Buyers of manganese ore may require analyses which show, in addition to manganese, the amounts of iron, silica, phosphorus, and in some cases, alumina and zinc.

Economic Considerations

Manganese ore is usually classed as "chemical" or "metallurgical" according to quality of material and the use to which it is adapted.

Chemical ore (sometimes designated battery ore) should be high in available oxygen. Since pyrolusite (MnO_2) contains more available oxygen than any other manganese mineral, chemical ore should contain a high percentage of pyrolusite. Present market quotations (Oct. 1941) are based on a minimum of 70-72 per cent MnO_2 with prices quoted of \$45 to \$50 per long ton in car lots. Higher grade ore would command a premium. For chemical ore, iron should be under 2 percent, copper .02 percent, and nickel and arsenic should not be present in appreciable quantity. Silica and phosphorus are not critical factors.

Metallurgical ore is used in far larger amounts than chemical ore since it is essential in steel making. For this purpose no satisfactory substitutes available in quantity and at all near the same price-range are known. Briefly, manganese added to ingots changes the contained iron sulphide to manganese sulphide, and by so doing makes a steel which may be forged. Manganese also combines with oxygen to effect deoxidation of the steel, likewise necessary to effect satisfactory forging. In addition manganese is required as an alloying element to give certain desired qualities to steel for specific purposes.

The customary way of adding manganese in steel-making is in the form of a ferro alloy, mostly as ferromanganese; but spiegeleisen, the low-manganese ferro alloy, is used for certain purposes.

Standard ferromanganese contains 80 percent manganese; the balance is iron together with up to 7 percent carbon and about 0.5 percent silicon. To obtain this high-manganese alloy, a high grade manganese ore is required. Usual quotations are based on ore containing 48 to 50 percent manganese, with maximum specifications of 7 percent iron, 7-10 percent silica, 0.12-0.18 percent phosphorus, 3-6 percent alumina, and 1 percent zinc. In addition Government specifications for stockpiling purposes require that all ore shall pass a 6-inch screen and con-

tain not more than $12\frac{1}{2}$ percent fines which will pass a 20-mesh screen. Sintered or nodulized concentrates should conform to these specifications.

Present market quotations (Oct. 1941) on ore of this grade are about 70 cents per long ton unit, or about \$35 per long ton delivered. 80 percent ferromanganese is quoted at about \$120 a long ton.

The "unit" price of manganese in the quotation above refers to the price per one percent of manganese in each long ton (2240 lbs.). In order to get the actual value per ton, multiply the quoted nominal unit price by the assay percentage of manganese. For instance, if the ore assays 47% Mn., at 65¢ per unit, the value is \$31.00 per long ton; and if it assays 51%, at 70¢ per unit, the value is \$35.70 per ton.

In periods of emergency, when high-grade ore is not available in sufficient quantities, lower grade ores must be used and below-standard grade ferromanganese is produced. During the first World War, alloy as low as 60 percent manganese was allowed, but use of such low-grade ferro alloys adds to the problems of the steel maker in producing high-quality steel, for the production of which he has been accustomed to using 80 percent alloy.

Low-grade manganese ores high in iron are used in making the ferro alloy, spiegeleisen, which is used to a much less extent than ferro manganese in introducing manganese in the steel-making process. Spiegeleisen usually contains about 20 percent manganese, the balance being iron with 4 to 5 percent carbon and about one percent silicon. As an indication of the amount used in 1937, the total amount of manganese consumed in using ferro-manganese and spiegeleisen was about 350,000 tons, of which about 320,000 tons was ferro-manganese. In addition, some 75,000 tons of manganese from high-manganese iron ores was consumed in making pig iron. (Rogers, 41).

Other manganese alloys used to a less extent in the steel making process are silicomanganese and silicospiegel, which as the names indicate contain relatively high silicon.

Manganiferous iron ores, (iron ore containing 10 percent or less of manganese) are used for making manganiferous pig iron. There is no shortage of such ores, and settlement is usually made as if the combined manganese and iron content were all iron.

Metallurgical manganese or manganese ore, ferro grade, is a strategic mineral "essential to the national defense for the supply of which in war, dependence must be placed in whole, or in part, on sources outside the continental limits of the United States and for which strict conservation and distribution control measures will be necessary".

Known domestic deposits of manganese ore are of lower grade than foreign ore, and in normal times it is cheaper for steel companies to import ore than to attempt to use domestic ores. The wisdom of such a course is beside the point. Under emergency conditions recourse must be had to domestic ores. Since domestic sources have been neglected in normal times, when the need for them comes, they must be investigated, developed, and their utilization studied, all under pressure because of the time element. Waste results and costs of production rise.

In 1939, according to U. S. Bureau of Mines Minerals Yearbook for 1940, domestic producers shipped 18,580 long tons of manganese ore (containing 35 percent or more Mn). At the same time imports for consumption were 627,131 long tons

with a manganese content of 313,811 long tons. Steel production for 1939 was a little over 47,000,000 tons. It has been reported that domestic steel requirements for 1942 would be considerably over 100,000,000 tons. Therefore, it is obvious that with a demand for manganese ore of well over 1,250,000 tons, and with a shortage of bottoms for transporting foreign ore, reliance must be placed on domestic deposits for a large part of this huge requirement. It follows also that every possible domestic source of ore will need to be utilized.

Origin and Consumption of Manganese in the United States: Domestic shipments and imports of manganese ore in long tons for the ten years (1928-1938) were as follows (U. S. Bureau of Mines Minerals Yearbook, 1939):

	Manganese Ore		Imports for Consumption	World Production Metric tons
	Domestic Shipments long tons 10 to 35% Mn.	35% or more Mn.		
1928	90,581	46,860	427,708	
1929	78,191	60,379	664,269	
1930	77,417	67,035	585,568	
1931	64,062	39,242	502,518	
1932	15,635	17,777	110,634	
1933	12,779	19,146	156,836	
1934	23,231	26,514	341,339	2,915,000
1935	93,291	26,428	383,500	3,981,000
1936	98,962	32,119	813,362	5,179,000
1937	151,955	40,241	911,919	5,987,000
1938	33,620	25,321	483,588	5,108,000
1939	239,544	18,580	627,131	(1)

(1) Data not available.

Considerable manganese is also imported as ferromanganese.

The sources of the imports of manganese ore for 1936 to 1938 in long tons are as follows:

	1936	1937	1938	1939
Cuba	37,876	122,937	131,423	105,936
Brazil	110,018	77,988	29,698	42,713
Gold Coast	241,593	254,547	126,858	242,924
U.S.R.R.	289,867	383,940	166,043	135,243
India (British)	126,913	70,380	25,480	89,545
Other	*	*	*	*
Totals	813,362	911,919	483,588	627,131

*A total of some 2 to 7 thousand tons came from Canada, Chile, France, Germany, Dutch India, Phillipines, and Union of South Africa.

The average price per ton of 48-53% manganese ore in the past has been:

1930	1935	1938	1939
\$ 24.94	\$ 23.70	\$ 25.89	\$ 23.00

The top price for domestic manganese (50% Mn.) was reached during World War I in 1918 at \$68.50; and in that year 305,861 tons were produced. The U. S. Geological Survey has estimated that, at an assumed index price of \$20.00 for 35% manganese, the possible domestic production might be:

First year	35,000--50,000
Second year	" "
Third year	" "

At a price of \$35.00 per ton the consumption would rise as follows:

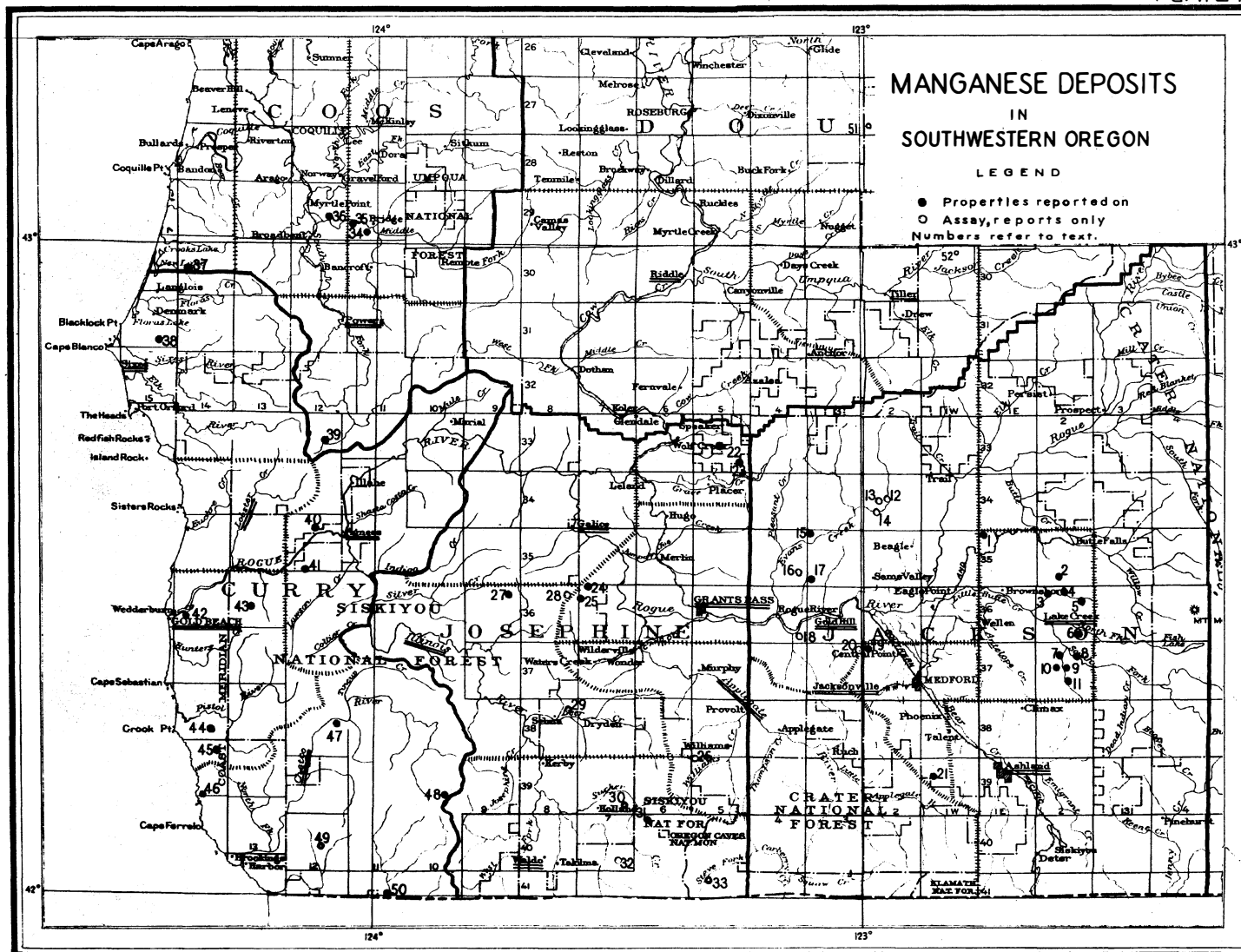
First year	80,000--100,000
Second year	100,000--150,000
Third year	200,000--250,000

To approach a 1,000,000 ton annual production, the price would have to go substantially higher.

Buyers of Manganese Ore in the West (1)

Clifford L. Ach., 440 Seaton St., Los Angeles, Calif.
 American Manganese Corp., Box 629, Terrence, Calif.
 Bethlehem Steel Corp., Bethlehem, Pa.
 Bradley & Ekstrom, 320 Market St., San Francisco, Calif.
 Colorado Fuel & Iron Co., Continental Oil Bldg., Denver, Colo.
 Columbia Steel Co., Russ Bldg., San Francisco, Calif.
 Electro-Metallurgical Co., 30 East 42nd St., New York, N. Y.
 Foote Mineral Co., 1609 Sumner St., Philadelphia, Pa.
 W. R. Grace & Co., 7 Hanover Square, New York, N. Y.
 Chas. Hardy, Inc., 122 E. 42nd St., New York, N. Y.
 E. J. Lavino & Co., Bullitt Bldg., Philadelphia, Pa.
 Ore, Metal & Engineering Corp., 112 Market St., San Francisco, Calif.
 Henry Rising & Co., 626 St. Paul Ave., Los Angeles, Calif.
 U. S. Steel Corp., 71 Broadway, New York, N. Y.
 U. S. Vanadium Corp., 114 Sansome St., San Francisco, Calif.
 Vance & Barnes, Ltd., 1131 Park Ave., Alameda, Calif.
 James K. Little, 802 Haas Bldg., Los Angeles, Calif.
 L. S. Hackney, 132 N. Kenmore Ave., Los Angeles, Calif.

(1) The names of most of these buyers were obtained from the California Division of Mines publication, Manganese of the Commercial Minerals of California. (Series 1941)



IV. MANGANESE IN SOUTHWESTERN OREGON

by
Ray C. Treasher

Introduction

Manganese minerals have widespread occurrence throughout southwestern Oregon. They are associated for the most part with old sediments and meta-sediments and usually represent superficial oxidation of rhodonite. In the Lake Creek area deposits of manganese oxides are found in cavities in volcanic tuffs and breccias. Most of the manganese deposits of southwestern Oregon have been developed insufficiently to permit definite statements concerning quality and quantity. In general, however, the deposits appear to be small, the combined-silica ratio is high, or the occurrence so erratic as to make prediction of ore reserves impractical.

Four localities that seem to have the best possibilities are: (1) Lake Creek deposits in Jackson County; (2) MacAdams deposits in southern Coos County; (3) Colgrove ranch and (4) upper Chetco River deposits in Curry County.

The manganese deposits may be divided into three generalized groups: (1) the Lake Creek area; (2) the Interior region; and (3) the Coastal region.

Lake Creek area

The Lake Creek area lies in Jackson County east of the pre-Tertiary rocks (see Medford and Butte Falls geologic maps: Wells, 39 and Wilkinson, 41). The deposits lie in six townships: T. 35, 36, 37 S., R. 1, 2 E. They are characterized by the deposition of manganese oxides in cavities of post-Eocene volcanic rocks, particularly red tuffs and breccias. Little or no rhodonite is present. There appears to be no marked concentration of manganese oxides except that they are confined to one flow breccia member; The oxides make up from 1 - 10 percent of the rock but the ore readily lends itself to gravity of a marketable manganese concentrate.

Distribution of manganese oxides within the flow breccia member is not uniform. Because the tuffs and breccias are flat-lying, drilling as a means of exploration of the more favorable prospects is recommended.

The Tyrrell mine produced and shipped manganese concentrates in 1917-1918; some drilling was done but the available records of this work are incomplete. Little work has been done on other deposits. The Tyrrell (# 8), Newstrom (# 6), and Coon Creek (#11), are considered the most promising. Wells' (39) summary is excellent and is quoted below:

"Deposits of manganese oxide filling open spaces are found in the "Tertiary volcanic rocks of the.....Lake Creek district..... Outcrops of manganiferous material are scattered throughout the district and the rocks that contain them are commonly colored red by iron oxide. The larger deposits are confined to one member, composed in part of flow breccia, and in part of tuff and breccia of explosive origin, and to fault breccia close to this member. Although the manganese was deposited mainly in cracks and irregularly shaped cavities, it has clearly replaced some of the enclosed rocks to a minor degree. In the upper part of the breccia member most of the oxide masses are soft and sooty and in the lower part they are rather hard and compact. Most of the harder material probably consists of manganite with minor quantities of pyrolusite and other oxides. A small part consists

of psilomelane. Soft but coherent wad of low specific gravity occurs in places throughout the breccia and powdery or sooty varieties of wad are found generally in cavities in the upper part. A soft, brown, unidentified oxide composed of bronzy lustered scales is widely distributed in small amounts. Locally kaolin, calcite, gypsum, barite, zeolites and a trace of gold, are associated with the manganese minerals. In most places the material exposed at the surface is estimated to contain from 0.5 to 3 percent of manganese, but at the Tyrrell Mine and at Newstrom prospect irregular masses of several tons are known to contain from 10 to 20 percent. Owing to the comparative softness of the tuff it is very easily separated from the harder manganese oxides by gravity separation, but the soft manganese minerals of low specific gravity may be difficult to recover.

"The main factor in the localization of ore is the presence of permeable rocks with openings of any kind. Obviously the breccia member is the most favorable place for prospecting and the most favorable places within this member are along faults. This structural control is best illustrated by the Tyrrell Mine.

"A complete explanation of origin would be premature at present, but certain inferences are appropriate. The character of the altered rocks implies that solutions permeating the volcanic series leached manganese and silica and transferred them to openings mainly in the breccia member. Whether the leaching took place at some distance from or within the breccia member is not clear. The prevalence of iron oxide that has discolored the breccia and other rocks in and around the deposits implies that the solution that brought the manganese oxidized but did not remove much of the iron. The more soluble manganese could have been removed from this rock but the amount of manganese is too great to be accounted for by such local leaching.

"Although the manganese deposits have doubtless been modified by circulating groundwater derived from the present surface, the facts enumerated above seemingly imply that the major concentration of manganese took place prior to the formation of this surface. This inference is supported by the facts that the manganeseiferous layer is overlain in places by unaltered flows and that erosion has been too rapid to permit much concentration of manganese just below the present surface".

Interior region

The Interior region includes Josephine County and that part of Jackson County lying west of the Tertiary series of volcanics. (see Grants Pass, Medford, and Butte Falls geologic maps: Wells, 39-40; Wilkinson 41). The rocks consist of pre-Jurassic ^{1/} metavolcanics and metasediments with Jurassic to Cretaceous serpentines, ultrabasics, Galice slate, sandstone and conglomerate, and granitic rocks. Manganese oxides usually represent the superficial oxidation of rhodonite, although some rhodochrosite has been reported. The oxides are found in small masses, or deposited along joints and fractures, and are intimately associated with the rhodonite. Reported assays usually represent surface sampling, and indicate 20 to 50 percent manganese, commonly with high silica. Very little in the way of development work has been done.

^{1/} Wells, Francis G., personal communication, May 28, 1941. These rocks were classed as Paleozoic by Diller and are so indicated on the Grants Pass Geologic map. Recent studies indicate that they presumably are Triassic instead of Paleozoic. Data will be presented by F. G. Wells and Preston E. Hotz, "The Applegate Group of Southwestern Oregon", in preparation.

In a few cases where work was done during 1917-1918, the old workings are usually caved and inaccessible.

The manganiferous rocks usually are associated with the metasediments. Outcrops may appear to be composed of high grade manganese oxides but a small amount of work exposes the siliceous material. In some cases, the outcrops have a rough northeast-southwest alignment parallel to the structural trends, and high dips are the rule.

Rhodonite is generally assumed to be of hydrothermal origin, according to Hewett and Pardee (33:680) who also say that manganese minerals are concentrated in epithermal zones or the higher parts of mesothermal zones, and that minerals with high manganese content are essentially lacking in characteristically mesothermal deposits, such as quartz lodes of California and Oregon, and the copper lodes of Jerome, Arizona. These authors state that the same may be said of hypothermal and pyrometamorphic deposits.

Manganiferous siderite is said to be characteristic of mesothermal zones; rhodonite of the transition between mesothermal and epithermal zones, and rhodochrosite and alabandite of epithermal zones.

In a few localities, however, such as in the manganese deposits in the Calaveras (Paleozoic) formation of the Sierras, there is evidence to suggest that instead of having a hydrothermal origin, the rhodonite may result from the metamorphism of sediments carrying manganese carbonates. Most rhodonite appears to be hydrothermal in origin, however.

Coastal region

The Coastal region includes Coos and Curry Counties. Many (probably most) of the deposits are associated with the Myrtle formation (Diller, 03) now provisionally assigned to the Franciscan (Jurassic). The manganese oxides occur as pods or nodules and were deposited along cracks and fractures in chert members of the Myrtle formation. The pods vary in size from a few pounds to 50 tons. The Coastal region has a very heavy cover of dense vegetation and deep soil; prospecting is difficult.

The most favorable localities are the MacAdams (#37); the Colgrove (#46); and the Long Ridge (#47). In each of these the manganese occurs as discrete bunches of high grade ore with considerable manganese-stained chert. Prospecting and mining of necessity must go hand in hand; first there is the search for a mass of "high-grade", then the digging out of the mass, followed by the search for another. The chert member is a good prospecting guide. No large bodies of ore have been developed, but it is reasonable to expect that a sizeable tonnage may be extracted from numerous small bodies. Usually the quality of the manganese in the pods is good and silica is fairly low.

The manganese oxide pods probably represent a concentration of manganese minerals that were deposited with the chert.

Reports of Occurrences

Reports on individual properties and prospects of Western Oregon are given on the following pages:

Jackson County

(1)

VESTAL GROUP

Lake Creek Area

These claims were developed during the first World War. No ore has been shipped and no work has been done since 1918. Manganese oxides occur in tuff; the ore zone is $1\frac{1}{2}$ - 2 feet thick and may cover several acres. Grade ranges from 10-25 percent manganese. Test pits and trenches constitute most of the work.

Location: Vestal claims, SW $\frac{1}{4}$ sec. 7 (?) T. 35 S., R. 1 E;
Banner claims, sec. 7 (?) T. 35 S., R. 1 E.;
Blackrock claims, sec. 8 (?) T. 35 S., R. 1 E;
Butte claims, sec. 9 (?) T. 35 S., R. 1 E.

The locality is along the divide between the forks of Reese Creek.

Authority: Pardee (21:15; 221-222) is quoted as follows:

"Several claims belonging to J. S. Vestal and others are in the basin of Reese Creek, about 6 miles north of Eagle Point and 20 miles northwest of the Tyrrell mine. A broad, flat spur at an altitude of 1,800 feet between two head-water branches of Reese Creek is underlain by purplish-gray to pink andesitic tuffs and flows that dip about 6° E. On the Governor claim small pits show soft vesicular pink tuff containing irregular streaks of manganese oxides, the largest of which are an inch wide. Some of the vesicles are lined with free crystals of manganese oxides; others contain zeolites. The ore is chiefly a mixture of pyrolusite and manganite, with some psilomelane and a soft pulverent oxide, that were apparently derived from the other two by alteration in place. The body exposed in the cuts is estimated to carry about 10 percent of manganese.

"Farther east, on the Blackrock claim, a cut exposes a layer of pink tuff 18 inches thick that rests on gray and green tuff and is covered by a few inches of soil. The pink tuff is crowded with vesicles about the size of an ordinary white bean, most of which are filled with compact, finely crystalline manganite. Vesicles in the upper 6 inches of the tuff contain soft oxides that appear to have been derived from the manganite by alteration in place. Plumose streaks of manganese oxides descend from the vesicles in the upper part of the tuff to those in the lower. A layer of the tuff 1 foot thick probably contains 25 percent or more of manganese. No manganese is visible in the underlying tuff, the green color of which is caused by chlorite.

"A bed of similar manganese amygdaloid is exposed in a pit on the Butte claim, east of the Blackrock. Probably the manganiferous layer underlies a total area of several acres and contains a moderately large amount of material carrying 10 percent or more of manganese.

"On the Banner claim, along Reese Creek south of the deposits described, a rather hard red tuff is exposed beneath a dense platy basaltic lava. Locally this tuff shows a few streaks and nodules of manganese oxides similar to those in the red tuffs at the other places described".

(2)

GRAND COVE PROSPECT

Lake Creek Area

This is a copper prospect, and it is reported that manganese oxides occur irregularly in spots and fractures through the altered rock. Insufficient manganese is present to justify development for this mineral.

Location: Sec. 29, 32, 33, 35; T. 35 S., R. 2 E., five miles north of Lake Creek.

Authority: From Callaghan & Buddington (38: 132-133) the following description is abstracted:

The flow rock, a dark vesicular labradorite andesite or basalt contains red spots that are iddingsite pseudomorphs after olivine together with calcite amygdules, and is stained greenish. The breccia is largely altered to clay minerals containing spots and veinlets of chrysocolla with a little malachite and azurite. Limonitic and manganese oxide occur irregularly in spots and fractures through the altered rock. Native copper, part of which is changed to cuprite is surrounded by opal and chalcedony with small amounts of chrysocolla and malachite, and occurs in dendritic form and in nodules.

(3)

NICHOLS PROSPECT

Lake Creek Area

Wad bodies ranging in size from grains to pockets a foot in diameter are found in cracks and vesicles of basalt and tuff. The zone is 2 - 10 feet thick, and it is exposed by test pits for a distance of 1,000 feet. Insufficient manganese is shown to justify development.

Location: S. E $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 4, T. 36 S., R. 2 E., in a fork of Salt Creek.

Authority: Pardee (21:221) reported as follows:

"The manganese prospect of Gus Nichols is about 5 miles north of Lake Creek post office, at an altitude of 2500 feet on the slope north of Salt Creek. Beginning at the foot of the slope, basalt, red and gray tuff, andesitic lava that shows hornblende crystals, gray tuff, and dark-gray basalt crop out one above another. These rocks are nearly horizontal and at least 500 feet thick in the aggregate. The topmost basalt layer evidently flowed as a molten lava over the tuff next below, for it is glassy, vesicular, and shattered at the bottom.

"The manganese is found in a layer from 2 to 10 feet thick made up chiefly of the lower part of the basalt described, with a little of the underlying tuff. As shown by a few shallow pits made at intervals for a distance of 1000 feet, some of the cracks and vesicles are filled with a soft black noncrystalline manganese oxide regarded as wad. These bodies of wad range in size from specks and grains to pockets a foot in diameter, but so far as the development work shows no considerable part of the layer contains enough of them to make it workable."

Hodge (37:15) reports as follows:

"---Nichols prospect in the SE $\frac{1}{4}$ sec. 4, T. 36 S., R. 2 E. in a fork of Salt Creek. This is said to be owned by F. S. Miller, Klamath Falls, Oregon. Only two shallow pits were found on the property at an elevation of about 2400 feet at the upper edge of a grassy exposure of agglomerate. The rock is a somewhat altered and decomposed tuff breccia containing manganese coatings on joint cracks. The pits

lie about 25 feet below the base of a flow of platy pyroxene andesite. Manganese is no more abundant in the prospects than is to be expected in any such exposure."

(4)

HOMESTAKE CLAIM (see also Daly pits)

Lake Creek Area

Red tuff with soft manganese oxides in small cracks and cavities is exposed in two places. No ore is developed.

Location: Sec. 5, T. 36 S., R. 2 E.

Authority: Pardee (21:221) reports as follows:

"The Homestake claim of I. C. Daly is about a mile west of the Nichols prospect, on a gentle south slope at an altitude of about 2200 feet. It is underlain by a red tuff much like that at the Tyrrell mine, and in two places pits show soft manganese oxides in small cracks and cavities. No ore is developed".

Hodge (37:15) reports on the Daly pits, in sec. 5, T. 36 S., R. 2 E., north of Salt Creek, and states that the pits "were not in actual manganese ore, but were for the sole purpose of establishing claims in case some ore was found in the vicinity". As nearly as can be determined the Homestake Claim of Pardee is the same as the Daly pits of Hodge.

(5)

STAR F RANCH (see also Farrar pits)

Lake Creek Area

Tuff bodies contain soft manganese oxides and irregular streaks and nodules. Indications of manganese cover an area of about 40 acres, but the material is evidently very low in manganese. No ore is developed.

Location: Sec. 11, T. 36 S., R. 2 E.

Authority: Pardee (21:221) reports as follows:

"On the Star F Ranch of C. L. Farrar, 5 miles north of the Tyrrell mine and 3 miles northeast of Lake Creek, red tuff forms a rounded hill 100 feet high and 30 or 40 acres in area. The surrounding land is rather flat and underlain by platy basalt, upon which the tuff rests. Near the top of the hill a shallow pit exposes small irregular streaks and nodules of manganese oxides, associated with a fibrous satiny-lustered white zeolite. The material exposed is evidently very low in manganese. Other masses of similar tuff are reported at short distances to the north and east".

Hodge (37:15) includes the "Farrar pit" in the same discussion as the "Daly pit" in sec. 5, and states that the pits "were not in actual manganese ore, but were for the sole purpose of establishing claims in case some ore was found in the vicinity".

(6)

NEWSTROM RANCH (see also Pech tunnel)

Lake Creek Area

This property and the Tyrrell mine are classed by Wells (39) as the most promising manganese-bearing localities of the Lake Creek area. A red tuff strip 1000 feet wide, a mile long and 200 feet thick rests on lava and underlies lava. The lower part of the tuff is crowded with small cavities and vesicles in which manganite and other oxides are found.

Generally manganite unmixed with other material forms compact bodies from the size of a grain of wheat to that of a walnut. The manganite assays 58 percent manganese, 5 percent silica, 2 percent iron, and but little phosphorus. Pardee was unable to find appreciable material rich enough to be classified as ore. However, the character of the material indicates that further prospecting might be warranted.

Location: Sec. 34, T. 36 S., R. 2 E., on the divide between the forks of Little Butte Creek.

Authority: Hodge (37) reports that a 48-foot tunnel, now caved, was reported by Mr. A. Pech, and that it contains material similar to that of the Tyrrell property.

Pardee (21:220-221) reports as follows:

"Manganese-bearing material is found about 2 miles north of the Tyrrell mine, on the Newstrom ranch. Here the red tuff underlies a strip 1,000 feet wide and a mile long that curves around the west and north slopes of the broad uneven ridge that separates the north and south forks of Little Butte Creek. The tuff is at least 200 feet thick, rests upon an uneven surface of dense platy basaltic lava, and at the top apparently grades into a dark-gray lava, the layers of which dip at a moderate angle to the northeast. The middle and lower parts of the tuff are fine textured and crowded with small cavities or vesicles. The top layer is rather dense and somewhat like a tuff-breccia. In a few places, the most noteworthy of which are on the north slope, the tuff crops out prominently, but generally it is concealed by a deep surface mantle. In all the exposures seen it is more or less decomposed, the freshest tuff observed being an opaque claylike material in which small feldspar laths are embedded.

"Manganiferous material is shown in several open cuts and natural exposures distributed through an area of 40 acres or more and at different levels from top to bottom of the tuff layer. The largest working, a cut 30 feet long and 12 feet deep, at an altitude of 2,500 feet, exposes the lower part of the tuff bed. Here the material in general is very poor in manganese, but small portions of it contain as much as 10 or 15 percent. Similar materials are shown here and there in other cuts, and the richer portions are generally found at a depth of a few feet. The ore consists of manganite and one or more unidentified soft brown to black oxides derived from it by alteration in place. Most of it is in pores or vesicles, the soft oxides as a rule in that part of the tuff just below the surface and practically all the manganite in the next deeper part. Generally manganite unmixed with other material forms compact bodies from the size of a wheat grain to that of a walnut. A sample of these bodies is reported to contain approximately 58 percent of manganese, 5 percent of silica, 2 percent of iron, and but very little phosphorus. Many of the vesicles are empty, and others contain calcite, gypsum, or zeolites. No considerable amount of material rich enough to be classified as ore is developed."

(7)

BUSH RANCH

Lake Creek Area

This property adjoins the Tyrrell mine property on the north and northwest.

Owner: B. M. Bush, Lake Creek, Oregon.

Location: Sec. 9, T. 37 S., R. 2 E. (Medford geologic map)
The ranch includes the $W\frac{1}{2}$ of the $NW\frac{1}{4}$ sec. 10; the $S\frac{1}{2}$ of the $NE\frac{1}{4}$ and the S. 31 rods of the $NE\frac{1}{4}$ of the $NE\frac{1}{4}$ of sec. 9.

Authority: Wells (39) and Libbey, F. W.

(8)

TYRRELL MINE

Lake Creek Area

(formerly known as Manganese Metals Co.)

Owner: B. M. Bush, Lake Creek, Oregon, and others.

Location: $W\frac{1}{2}$ $NW\frac{1}{4}$ sec. 10, T. 37 S., R. 2 E., extending into $W\frac{1}{2}$ $SW\frac{1}{4}$ sec. 10 and $SW\frac{1}{4}$ $SW\frac{1}{4}$ sec. 3.

Area: 80 acres.

History: Pardee (21:218-220) says that the Manganese Metals Co. developed the deposit in 1917, and built a 20 ton concentrating mill. Prior to July 15, 1918, some 200 tons of concentrate were produced. Late in the summer of 1918 Victor Rakowsky, of Joplin, Mo., prospected by drilling a part of the land controlled by the manganese Metals Co. No work has been done on the property since that time.

Development: The main working is an open cut 100 feet long and from 20 - 30 feet deep. At intervals for 1000 ft. or more northward smaller cuts were made at the same level along a tram grade. There is a total of 150 feet of tunnelling; the main tunnel was forked in three directions. The workings have partially caved.

Equipment: There is no equipment on the property.

Geology: Pardee (21:219) states that "The rocks are nearly horizontal basaltic flows and tuffs. A dense dark gray basalt of a platy habit occupies the lower part of the slope east of Lost Creek. With the aid of a hand lens small laths of feldspar and grains of olivine are visible in it. Next above this is a layer at least 100 feet thick of soft porous brick-red tuff, and above the tuff, forming the top of the spur is a basalt generally similar to that on the lower part of the slope. At the south side of the mine the rock mentioned are cut by a steeply pitching diabase dike 10 feet wide that strikes east.

"The ore is found in the upper part of the red tuff as irregular veinlets and nodules. The main cut exposes a layer of tuff 16 feet thick, the lower 10 feet of which is rather thickly crowded with these bodies. The other workings, including the drill holes, show that the ore-bearing layer is practically continuous northward for 1000 feet and that, at least on the nose of the spur, it extends a considerable distance under the basalt. A minimum thickness of 6 feet is shown in

places north of the main cut, and one of the drill holes is said to have passed through 30 feet of manganiferous material. South of the main cut the ore-bearing layer is cut by a diabase dike, beyond which for a short distance, a little ore-bearing material is exposed here and there, but its extent in that direction is not determined.

"The ore consists of manganese oxides, chiefly manganite, with a moderate amount of psilomelane and a little soft black and bronze oxides. These minerals have filled cracks and cavities, replacing the tuff very little if at all". (see Wells' discussion.) "The manganite is of fibrous to prismatic crystal habit, the aggregates commonly showing plumose forms. Sections of the ore bodies generally show an outer thin shell of psilomelane, succeeded by one or more concentric layers of manganite. In some nodules an unfilled space remains in the center. The soft oxides are practically confined to the upper or weathered parts of the manganiferous layer. Commonly they preserve the outward crystal forms of manganite. Locally a little gypsum occurs with the manganese minerals, and barite is reported in some of the ore. In the manganiferous layer, especially in the upper part, the tuff is more or less altered to a soft clayey material consisting largely of kaolin and iron oxides. A waxy pale greenish-yellow variety of kaolin is commonly associated with the softer manganese oxides.

"-----Most of the higher-grade material so far developed is within 150 feet north of the diabase dike, though that rock evidently was not the source of the manganese. Probably, however, it shattered somewhat the adjoining mass of tuff, which was thus made more favorable for mineral deposition".

Wells (39), in a general discussion of the manganese-bearing area says, -- "solutions permeating the volcanic series leached manganese and silica and transferred them to openings mainly in the breccia member".

Tenor of ore: Pardee's (21:219) examination showed that:

"The crude ore treated at the mill is reported to have averaged about 20 percent of manganese. This material was selected from the lower 10 feet of the manganiferous layer, in which most of the harder oxides are found. A sample -- representing the lower 12 feet of the layer -- contained 14.86 percent manganese. Other samples mostly representing the upper part of the layer --- is reported --- being 2.13 percent. Samples of two car lots of concentrate reported by the Manganese Metals Co. carried 47.5 and 48.5 percent of manganese; other samples of concentrate contained from 46.5 to 52.8 percent of manganese, 11.1 to 14.5 percent of silica, 1.4 - 0.9 percent of iron, 0.09 to 0.207 percent of phosphorus, and 0.08 to 0.16 oz. of gold to the ton."

Samples cut by the Hodge survey (37:15) showed:

#87, a 5-lb. grab sample of concentrates:

Manganese	55.00 %
SiO ₂	9.36
Fe ₂ O ₃ & FeO	2.40
P ₂ O ₅	0.045

#88, 23 lbs. across 8 ft. of small ore body in shorter adit assayed for manganese only:

Manganese	12.74
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Samples taken by Libbey (Grants Pass State Assay Laboratory) with checks by B. F. Webber (W. A. Markert, Iron River, Michigan):

	<u>Libbey</u>		<u>Webber</u>
	<u>Mn</u>	<u>Mn</u>	<u>Fe</u>
#1	2.47%	2.55 %	7.6 %
2	0.47	0.55	5.1
3	2.41	2.44	7.8
4	8.20	7.83	6.8

#1 - S. Wall, short tunnel from cut about 200 feet south of N. end of old train road bed.

#2 - About 8 feet of red tuff with sparsely disseminated manganese oxides above short tunnel of #1 sample.

#3 - Red Tuff 4 feet thick, middle of cut at N. end of old train road bed.

#4 - Cut 100 feet E. of N. end of old train road bed, 4 feet of tuff just above floor of cut.

Summary: This property has had more work done on it than any other manganese deposit in southwestern Oregon. Ore was mined and concentrated here during the first world War. There are 150 feet of underground workings, (now largely caved), a large open cut, and, reportedly, 15 churn holes were drilled. The mill, built in 1917 and now demolished, had a capacity of about 20 tons in 24 hours.

Mined ore is reported to have assayed 14-20 percent manganese for the higher grade and ranged down to 2 percent. Manganese concentrate assayed from 46.5 to 52.8 percent manganese.

The tenor of the rock is low, and probably will not average over 10 percent manganese in hand picked ore as at present exposed. In most of the rock it will average between 1 - 3 percent. In the case of such an irregularly disseminated ore it is impossible to predict economic possibilities in advance of systematic exploration.

The ore consists of manganese oxides filling cracks and cavities, and in part replacing the tuff. The ore zone is poorly defined; the tenor varies markedly in different sections; drilling appears to be the most feasible method of exploration.

Some geologists believe that manganese minerals were concentrated near, and originated from, a nearby diabase dike. Others are inclined to agree with Wells(39)*. Occurrences of manganese at other localities in the Lake Creek area tend to support the opinion of Wells.

If the deductions of Wells (39) are correct, a drilling program might outline commercial ore. But by the same token it is difficult if not impossible to predict ore possibilities from exploration work done to date. A favorable factor is that the manganese minerals present make a metallurgical grade concentrate.

*op. cit.

(10)

FOX PROSPECT (also known as Sierra Metals Co.)

Lake Creek Area

Soft manganese oxides, exposed in shallow cuts and trenches, occur in pores and cavities of tuff. No ore is developed. It is assumed that the Fox prospect is the same as the Sierra Metals Company described by Pardee (21:222)

Location: sec. 17, T. 37 S., R. 2 E., on ridge between Lake Creek and Lost Creeks.

Authority: Wells (39)

Pardee (21:222) describes the claims as follows:

"Several claims belonging to the Sierra Metals Co., are on the wide flat ridge between Lake Creek and Lost Creek, about 3 miles southwest of the Tyrrell mine. They include an area of red tuff that crops out at altitudes ranging from 2500 to 2700 feet. A few shallow pits show a little soft manganese oxides here and there in the pores or cavities of the tuff. In places the red tuff is overlain by remnants of a bed of gray tuff, and in places large boulders of a brown jaspery quartz containing seams of manganite are scattered over the surface. No ore is developed."

(11)

COON CREEK CLAIMS (also known as Gemmell claims)

Lake Creek Area

Soft manganese oxides are found in cavities in red tuff, over a considerable area. One test pit shows good concentration of manganese oxides. Survey of the area suggests that the oxides were not deposited in any one zone or layer and that deposition was spotty. Further prospecting might show manganese oxides over a considerable area, but at present insufficient work has been done to indicate ore possibilities.

As nearly as can be determined this deposit is the Gemmell deposit of Pardee (21:222), which is quoted below:

"A considerable area of red tuff south of the Sierra Metals Co.'s ground is covered by the Gemmell claims. According to Mr. Parks, the outcrops show about the same amount of manganese as elsewhere".

The following is from the report by the State Department:

Owners: Timber Products Co., Medford, Oregon.

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 20, T. 37 S., R. 2 E., at the head of Coon Creek, a tributary of Lost Cr., which is a tributary of South Fork Little Butte Creek; and about 2 $\frac{1}{8}$ miles S. W. of the Tyrrell Manganese Deposit. Marked as # 9 on the Medford Geologic Map.

History: Prospecting in the Coon Creek area has been fairly active recently, stimulated by the demand for strategic minerals. The Timber Products Co. has financed most of the work.

Development: Development consists of one test pit, about 5 feet square and 10 feet deep. A few scattered "shots" have been fired in tuff masses nearby.

Geology: The general geology of the area is discussed by Wells (39). The principal country rock is a lava series composed of "dominantly dark-gray andesite flows with local layers of tuff and breccia". Interbedded in these flows is a "buff fine-grained tuff with fragments of flow rock".

Conditions of manganese deposition are discussed by Wells in the text on the back of the geologic map. Briefly, manganese-bearing solutions percolated through the tuff; where conditions were favorable, manganese oxides were deposited.

The tuff at Coon Creek has a distinct reddish color. In part it is quite porous; some of it is dense. Some fragmental material that looks like volcanic bomb fragments was found.

Manganese material in the test pit, carefully sampled by Mr. Herman of Timber Products Co. and assayed by A. A. Lewis of the State Assay Laboratory, averaged 4.9 percent Mn. The tuff is dark red, containing small to large masses of black oxide. The top of the ridge is well sprinkled with tuff outcrops, some of which form sheer cliffs up to 30 feet high. Only in occasional spots were any manganese oxide showings found in these cliffs.

Some oxide stain was found in joint cracks and lining cavities in the tuff. If the material in the pit averages 4.9 percent Mn, the average for the entire deposit will be considerably lower.

Report by: Treasher 9/4/40

(15)

LEE MANGANESE (Neathamer Manganese)
(Capitol Hill)

Gold Hill Area

Manganese occurs as replacement in quartzite and is derived from rhodonite. Outcrops range from 2060 - 2520 feet in elevation over a width of several hundred feet. Some ore was taken out during the first World War and piled alongside the Evans Creek road, but was never shipped.

Authority: Hodge (37:7) reports as follows:

"The property in the NW $\frac{1}{4}$ of Sec. 6, T. 35 S., R. 3 W., under lease to Horace F. Lee, consists of 160 acres, on which there are several manganese outcrops. The manganese is a replacement in quartzite and was derived from rhodonite. It is very siliceous and of doubtful value as a manganese ore. The outcrops range from 2060 to 2520 feet in elevation, and were opened up in search of gold. The rock on the dumps looks like fine manganese ore, but when fragments are broken, the manganese is revealed as only a superficial coating on quartzite. The dip of the quartzite is about 25° N. 60° East.

"The best showing is on the ridge where the manganese is lower in silica. The manganese would have to be hauled 11.5 miles to the Rogue River, then loaded into freight cars and shipped 306 miles to Portland by the Southern Pacific Lines.

"The four-pound sample across the best manganese, from one to two feet wide, an analysis yielded:

	%
SiO ₂	33.83
Fe ₂ O ₃	9.79
P ₂ O ₅	----
MnO ₅	34.29
Undetermined	22.09
	<u>100.00</u>

Moisture 1.66"

Pardee (21:223) reported on a property that is identified as the same one discussed here. He called it the Capitol Hill property and reports as follows:

"The Capitol Hill prospect is on the homestead of J. W. Neathamer, along Evans Creek, about 12 miles by road northeast of Rogue River station on the Southern Pacific Railroad. The deposits are tabular of thin lenslike bodies 5 feet in maximum thickness. One is exposed for a length of 20 feet and a depth of 10 feet, and another for a length of 100 feet. They occur along the bedding of steeply tilted pre-Tertiary slaty rocks and consist chiefly of quartz and rhodonite. Near the surface more or less of the rhodonite is changed to oxides, and the superficial parts of the deposit contain a small amount of ore."

The State Department report is as follows:

Owner: The SE₄ of sec. 6 is owned by Jesse Neathamer; the E₂ of the SW₄ is government property.

Location: West center sec. 6, T. 35 S., R. 3 W., on hill north of the Evans Creek Road.

History: It is reported that the Oregon Manganese Co. which worked on Coyote Creek mined ore at this deposit and stock-piled it along the road. No ore was shipped, however.

Geology: The deposit is in the May Creek schist (Devonian ?) (Diller, 24) which is considered as part of the Applegate series by Wells and Hotz (Wells, 40). These schists contain lenses and bands of manganiferous material, usually rhodonite. The rhodonite has weathered at the surface to manganese oxides which frequently assay rather high in manganese, but also contain rather high combined silica.

This deposit is of the weathered rhodonite type. When chunks of black oxide are broken, the pink rhodonite usually shows within the specimen.

The principal deposit is near the top of the "mountain" at an elevation of 2700-3000 feet, and about 1500 above the highway. There is no road and no trail to the deposit. Surface excavations constitute the only development work.

Conclusions: The mountainside has showings of manganese oxide associated with rhodonite. Some "ore" has been mined and piled at the roadside. No conclusions as to the width of the ore body, or its size could be obtained from the meager workings. The presence of rhodonite practically excludes it from economic consideration at this time.

Informant: Treasher 4/8/41

(17)

NO NAME MANGANESE

Gold Hill Area

Manganiferous material in quartzite and chert is associated with rhodonite. Several test pits have been opened on the hillsides along the strike of the "manganese ledge". All that were seen show manganese oxide associated with rhodonite.

Location: Sec. 25, T. 35 S., R. 4 W., and sec. 30, T. 35 S., R. 3 W. on Wards Creek, east of the Gold Chloride prospect.

History: Manganiferous material has been prospected in this area for a number of years. Little work has been done other than a few test pits.

Geology: The "ore" material lies within the May Creek Schist (Diller, 24) or the Applegate series of Wells and Hotz as described in the Lee Prospect report.

Material seen is of the weathered rhodonite type. Chunks of black oxide show pink to whitish rhodonite when the chunks are broken down.

There are several test pits over a distance of about a mile. Those examined show rhodonite. There is no road or trail to the deposits.

Conclusions: The presence of rhodonite excludes it from economic consideration at this time.

Informant: Treasher 4/8/41.

(19)

BAILEY MANGANESE

Gold Hill Area

A four-foot fracture zone contains manganite and psilomelane with traces of rhodonite. There is one trench 6 - 8 feet wide which follows the mineral zone on the hillside and exposes it at 3 levels within a horizontal distance of 45 feet and a vertical distance of 30 feet. Association of the ore with rhodonite would make it difficult to get a manganese concentrate low in silica.

Owner: A. L. Bailey, Rt. #7, Box 124, Central Point, Oregon.

Location: SE $\frac{1}{4}$ sec. 1, T. 37 S., R. 3 W., Jackson County.

History: The following is quoted from the Hodge (37:8) report:

"This occurrence of manganese ore is on the east side of the narrow canyon almost at the source of Lane Creek, or the west fork of Willow Creek, in the SE $\frac{1}{4}$ sec. 1, T. 37 S., R. 3 W., Jackson County. The Bailey house is further upstream, and on the opposite side of the creek, in the SW $\frac{1}{4}$ sec. 12. Postoffice address is Box 124, Route 7, Central Point, Oregon. The Baileys are operating a small amalgamation mill in the creek, working gold ore from a nearby locality. A small but rich pocket of gold ore closely adjacent to the manganese deposit has been worked out."

"The exposure of manganese ore lies on a steep hillside, only 250 feet from the road and 120 feet above it. From this point, it is $1\frac{1}{2}$ miles down a dirt road to the old Jacksonville-Gold Hill turnpike, and thence 4 miles by level, gravelled road to the Southern Pacific railroad at Central Point.

"The rocks of the neighborhood are old metamorphics. At the place in question, a nearly vertical fracture zone, striking due N-S, has been mineralized with manganese oxides to a width of about 4 feet. Manganite and psilomelane predominate, but traces of rhodonite suggest that at greater depth, below atmospheric weathering, the ore is likely to become more siliceous. As observed at the outcrop, a given lump of ore appears to have a fairly uniform composition, indicating that little or no improvement in its manganese content could be obtained by crushing and concentrating.

"Development to date is a trench, 6-8 ft. wide, following the mineral zone uphill and exposing it at 3 levels within a horizontal distance of 45 ft. and vertical distance of 30 ft. The hill rises rapidly--130 ft. in 350 ft.--along the projected strike of the zone to the south, and further exploration both above and below the present workings would be a simple matter; this should be undertaken by the owner before he can expect to attract more active interest in his property."

(21)

PETERS MANGANESE

Ashland Area

Rhodonite, superficially oxidized to manganese oxides, is exposed in two open cuts.

Location: NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 17, T. 39 S., R. 1. W., near Section Line Gap.

Owner: W. H. Peters, Glendale, Oregon.

Geology: This is a quartzose, tabular deposit containing considerable amounts of rhodonite superficially oxidized to manganite and psilomelane, with minor amounts of pyrolusite. Two surface cuts separated by a distance of about 100 feet are the only development. The north cut is in two benches and here expose the deposit in three sections. The lower cut shows the footwall section with a thickness of about 5 feet, and the top cut shows a hangingwall section about 10 feet thick. Both of these sections show quartz and rhodonite, with the latter more or less completely oxidized. Many pieces on being broken show unaltered rhodonite at the center with hard black oxides on the outside. Other pieces are wholly oxidized, but often show silica remnants. Between the footwall and hangingwall sections is a middle quartzose section, about 5 feet thick, having the texture and appearance of a quartzite. This section is very hard and dense, and contains little or no visible manganese minerals. The walls are metamorphosed sediments, with the hangingwall a much altered, soft, iron-stained schist. The strike of the deposit is approximately N. 50° E., and the dip is about 60° N.W. There is a layer of soft, limonitic, quartz material, about 3 feet thick, along the footwall. At the north opencut, the hangingwall section shows the greater quantity of manganese minerals.

The south opencut is about 30 feet long and exposes similar material to that described for the hangingwall section of the north opencut. A few tons of black oxides were piled on the dump. Outcrops of the schist on the hill to the south showed only a small amount of manganese staining.

The primary manganese mineral is rhodonite, the manganese silicate, and, judging by the present exposures of the deposit, the oxidation has been quite superficial. The quantity of desirable manganese ore here is small.

Informant: Libbey 12/22/37

Josephine County

(22)

OREGON MANGANESE COMPANY

Greenback Area

Local residents report that the Boulder Manganese claim covers the ground formerly held by the Oregon Manganese Company. If so, this deposit should be included under Boulder Creek Manganese & Mineral Ledge.

Authority: Pardee (21:224)

"The claims of the Oregon Manganese Co., on Coyote Creek about 6 miles east and southeast of Wolf Creek station on the Southern Pacific Railroad, include a crushed zone in pre-Tertiary slate that shows in places films of manganese oxides. No ore was developed when the workings were examined in October, 1917".

(23)

BOULDER CREEK MANGANESE & MINERAL LEDGE

Greenback Area

Manganese oxides occur in pre-Tertiary (Galice ?) slates at the crossing of the King Mountain Truck Trail with Boulder Creek. A small dump, and a 100-foot tunnel represent the workings. Some "ore" is on the dump. The "ore" appears to be slate that is manganese stained on cleavages and fractures; in certain localized areas sufficient manganese was deposited to form low-grade ore.

It is reported that another group of claims about $\frac{1}{4}$ mile northwest has better showings of manganese oxides. A search for these workings was unsuccessful.

The Department report is given herewith:

Owner: Dan N. Trudell, 329 West L St., Grants Pass, Oregon.

Location: Sec. 25, T. 33 S., R. 5 W., on King Mtn. road, just east of its crossing with Boulder Creek.

Area: One claim located August 31, 1940.

History: It is reported that this deposit produced a small amount of manganese ore during the first World War; as nearly as could be determined the Oregon Manganese Company then held the ground. (Parks and Swartley, 16:173).

Development: There is one adit about 100 feet long. Manganese stained rock shows at the portal and inside, about 40 ft. from the portal, a small pocket was taken out. Just above the tunnel is a shallow prospect trench that exposes a brownish rock that might be mistaken for manganese ore. There are reports of more workings up the hill, but none could be found; also reported workings about $\frac{1}{4}$ mile northwest could not be found.

Geology: The country rock is classed by Diller as Galice formation but it has been identified as similar to the Applegate series of the Illinois Valley (Wells, 40). The rock is quite slaty and seems to be quartzose to cherty. Manganese oxides stain many cleavage surfaces and in some places the rock is quite black.

No samples were cut as the "good ore" was situated at a place where it was considered unsafe to cut a sample. "Ore" piled on the dump would not go over 5 percent manganese oxide.

The slaty cleavage trends N. 35° E., dip is 45° S. E.

(24)

GEORGE MCALLISTER-WAX CAMPBELL MANGANESE

Grants Pass Area

Owners: George McAllister and Wax Campbell.

Location: Sec. 5 (?), T. 36 S., R. 7 W., near the summit of the slope north of Shan Creek at an elevation of 3000-3500 feet.

Area: Four claims; Manganese Mystery No. 1, 2, & 3, and Manganese Mystery Extension.

Geology: The locality is made up principally of granitic rocks, probably tonalite, (Winchell, 14). The country rock in the vicinity of the deposit is a porphyritic variety, resembling a diorite, in places much altered and having a schistose structure.

The deposit has been explored mainly for gold on the Manganese Mystery No. 1 claim where it is reported that high grade gold ore has been found. There are several opencuts and two shallow shafts have been sunk. The area thus explored represents about 200 feet by 150 feet in extent.

The outcrop appears to represent a siliceous phase in the diorite, characterized by small quartz lenses and stringers with considerable rhodonite, now mainly altered to manganese oxides. There are large blocks, up to two or three hundred pounds in weight, at or near the surface, which have the appearance of being nearly pure, hard manganese oxides, but on being broken, most of them show remnants of unaltered rhodonite with quartz. The largest opencut showed that in sinking 10 or 15 feet below the surface, the manganese oxides became perceptibly smaller in quantity. It seemed probable that exploration to the west of the present openings would show more of the oxidized rhodonite.

The altered porphyry wall-rock has been permeated and stained by manganese oxides over the area opened up; and, in places close to the original rhodonite croppings, the oxides have been deposited in irregular small veins and stringers making up a third to a half of the rock. These oxides decrease in proportion to the distance away from the quartz-rhodonite outcrops until it becomes a very thin staining.

A wall on the west side of the outcrop, probably indicating the trend of the deposit, strikes due north and dips steeply to the east.

Further surface work would probably expose more of these oxidized rhodonite outcrops, but it is improbable that more than a small tonnage of selected manganese oxides could be made available, and that would be a highly siliceous product. A sample of manganese stained porphyry over a thickness of 6 feet was

taken in the face of the largest opencut and returned 2.87 percent manganese. A sample of hand-sorted ore on the largest dump gave a return of 17.3 percent manganese.

Informant: Libbey, 37.

(25)

BRITTON MANGANESE

Grants Pass Area

Based on information supplied by Mr. J. R. Harvey of Grants Pass, Oregon, this property is located at the forks of Shan Creek in sec. 7, T. 36 S., R. 7 W. Harvey reports that considerable underground work was done but that the workings are caved at present. The deposit is considered as non-commercial.

Pardee (21:223) reports as follows:

"The claims of G. W. Britton and others are on Shan Creek 4 miles east of Rogue River and about 15 miles northwest of Grants Pass. They include several lenslike bodies of rhodonite and cherty-appearing quartz lying along bedding planes in steeply tilted slaty rocks of pre-Tertiary age. The largest body exposed is 18 feet long and 6 feet wide. Near the surface it is oxidized and contains a little ore."

In this general area is the George McAllister-Wax Campbell manganese property (sec. 5 ?) and farther northeast nearer Pickett Creek, J. E. Bartlett of Grants Pass, Oregon, reports outcrops of manganese oxides associated with rhodonite.

(26)

ELDER MANGANESE

Lower Applegate Area

Owner: J. R. Elder (?)

Location: Sec. 6, T. 39 S., R. 5 W., south of Mungers Creek.

Geology: The rocks of the locality are old, highly metamorphosed sediments.

The only opening in the deposit is an opencut about 10 ft. long with a face about 8 ft. high, all in a black, siliceous, metamorphosed sediment, into which hydrothermal solutions have penetrated, depositing quartz, rhodonite and a small amount of rhodochrosite in irregular small seams and lenses. A thin coating of hard manganese oxides covers some fracture planes, and a little soft black oxide occurs in joint cracks near the surface.

The rock may be cobbled to show fairly large pieces of deep pink rhodonite, and several hundred pounds has been sold to collectors and lapidaries. The work on the deposit has been done to obtain rhodonite for this purpose.

The surface indicates a considerable area of similar country rock, and probably trenching would show a greater extent of the rhodonite occurrence. From the standpoint of producing a metallurgical manganese ore, however, the prospect shows little promise.

Informant: Libbey, 37.

(27)

ELKHORN CREEK MANGANESE

Illinois River Area

Location: NW $\frac{1}{4}$ sec. 13, T. 36 S., R. 9 W., in the saddle west of Manganese Point at elevation of 3680 feet.

There are three 2-foot parallel ledges, striking north 35° west, dipping 70° west in contorted banded quartzite, composed of rhodonite and yellow garnet (andradite) stained by black oxides along jointing. Five open cuts total nearly 100 feet, one of them 35 feet long.

The occurrence as manganese silicate precludes economic use of this material under present conditions.

Informant: Allen, 36.

(31)

OW YUEN CLAIMS

Waldo Area

Pods and boulders of rhodonite and pinkish to greenish quartzite are superficially stained with black manganese oxides. Several shallow cuts expose the siliceous ore. Unless a commercial process for the treatment of rhodonite ore is developed, the deposit has little promise for the production of ferro-grade manganese ore.

Owners: Tom Brown, J. S., & J. R. Kelly, Roseburg, Oregon.

Location: NW $\frac{1}{4}$ sec. 5 and NE $\frac{1}{4}$ sec. 6, T. 40 S., R. 6 W., just south of Caves Hwy. 46.4 miles from Grants Pass, and 14.4 miles from junction at Cave Junction.

Area: Three claims, held by location, recorded at Grants Pass, Oregon.

History: Located by Tom Brown, May 21, 1915, and relocated by the above owners about 8 years ago. An easement has been granted to the Oregon State Highway Commission across the Ow Yuen claim, for the Caves Highway.

Development: About $\frac{1}{4}$ mile of road is being constructed from the Caves Highway to the center of the claims where there are two cabins. The deposits lie on both sides of Cave Creek. There are three groups of shallow cuts; one group has 4 cuts, another has two cuts, and the third has one cut. No underground work has been done.

Geology: According to (Wells, 40), the country rock is meta-volcanic with some serpentine to the west in sec. 6. According to the field examination, it appears that the rock associated with the rhodonite is quartzite, or other highly silicified rock. The quartzite (?) is sheared, with development of some sericite. Near the rhodonite the quartzite (?) is stained greenish or pinkish.

The rhodonite appears to lie in small pods or in bouldery masses. There is a slight suggestion of bedding in one spot, with a northeast trend. The rhodonite masses seem to grade into the siliceous country rock and with the amount of development work which has been done, no definite limits could be set.

The outcrops and exposures have the appearance of being high-grade oxide. However, the oxide is merely a thin "skin" and a light hammer blow exposes rhodinite, some of which has a beautiful pink color.

Report by: Treasher 5/15/41

(32)

ALTHOUSE-RUN GULCH PLACER

Waldo Area

Showings of manganese ore have been found on two of the placer claims. Samples submitted to the U. S. Bureau of Mines are reported as high-grade manganese. No development work has been done. No assay results are available.

Owner: A. N. Steele, Holland, Oregon.

Location: Sec. 26, T. 40 S., R. 7 W., on Run Gulch, a tributary of Althouse Creek.

Area: Eight placer claims; manganese is reported on two of them.

Informant: A. N. Steele 4/10/41.

Coos County

(34)

ROOKARD MANGANESE

Coquille Area

A shallow trench has exposed some boulders of psilomelane and some manganese-stained chert. There is little evidence that the manganese material is other than superficial concentration, and there is no indication of commercial tonnage.

Owner: Sam Ockltree, Bridge, Oregon leased to J. H. Rookard, Bridge, Oregon.

Location: NE $\frac{1}{4}$ sec. 33, T. 29 S., R. 11 W., on Salmon Creek, about 200 feet above the creek.

Geology: The geologic map of the Coos Bay quadrangle (Diller, 01) shows the country rock to be Eocene Pulaski sediment, intruded by some small knobs of Eocene basalt. The country is heavily brush-covered and weathering is deep. The rock at the manganese outcrop appears to be cherty.

Several small pieces of manganese "ore" have been piled. The "ore" consists of manganese oxides with considerable cherty material intermixed. No "ore" was seen in place. There were two or three small sized boulders of manganiferous cherty material still stuck in the soil.

It is claimed that one sample assayed 46.8 percent manganese. It might be possible to hand pick such a sample but it is extremely doubtful if a fair sample of the bouldery material would exceed 10 percent manganese; silica would be very high.

Informant: J. H. Rookard, and Treasher.
Report by: Treasher, 5/20/41.

(35)

HONE MANGANESE

Coos Bay Area

Reported manganese on this property proved to be basalt and stained sandstone.

Owner: Axel Hone, Box 1144 Bunker Hill, Marshfield, Oregon.

Location: Sec. 30, T. 29 S., R. 11 W.

Area: Deeded land.

Geology: According to the geologic map of the Coos Bay quadrangle (Diller, 01), the country rock is Eocene Pulaski sandstone with intrusions of Eocene basalt. The main locality was in the bed of a small stream where a basalt intrusion has formed falls in the stream. No evidence of manganese was found. The other locality consisted of stained Pulaski sandstone (principally iron stain).

Informant: Axel Hone and Treasher.
Report by: Treasher, 5/20/41.

(36)

GUERIN MANGANESE

Coos Bay Area

Manganese stained cherts are found over a considerable area, and in some places manganese oxides are concentrated into masses. The grade of manganese is low; siliceous material is abundant. The widespread occurrence of manganese oxides suggests the possibility that thorough prospecting might develop considerable low-grade ore.

Owner: C. V. Guerin, 1227 "D" St., Marysville, California.

Location: Center sec. 22, T. 29 S., R. 12 W., about 3 miles southeast of Myrtle Point, along a southwest trending ridge at an elevation of 500 to 900 feet.

Area: Deeded land.

History: A few years ago, a group from California took an option to develop the manganese. An open cut on the ridge exposed manganese oxides, so a tunnel was driven from a lower elevation to cut the manganese body. No ore was encountered and work was discontinued.

Development: The tunnel, 130 feet long, now caved at the portal, was driven northeasterly. Above the tunnel, an open cut two feet wide, 20 ft. long, and 10 ft. high at the back explored an outcrop. Many shallow pits can be found along the ridge.

Geology: According to (Diller 01) the country rock is Myrtle formation (Franciscan(?) Jurassic), cut by a pod of amphibole schist. The only rock observed during the field inspection was chert, rose to green to blue in color, stained along fracture planes with manganese oxides. Where exposed, the manganese chert appeared to be in layers between non-manganese cherts. Soft black oxides are superficially concentrated at the surface. The general trend of the manganese outcrops is N. 20°E., and the attitude seems to be vertical.

If the ore on the tunnel dump is an indication, no manganese was encountered in the tunnel. The superficial concentration at the surface and the low-grade of the manganese chert leads to the conclusion that while the total amount of manganese may be large, its grade is probably too low to permit commercial concentration.

A sample across the face of the open cut above the tunnel represents the most favorable ore seen in place. Analysis at the Grants Pass State Assay Laboratory gave:

Manganese.....	10.9 %
Insoluble.....	70.6 %

Informant: Treasher, 5/8/41.

(37)

MCADAMS MANGANESE

Beach Area

Owner: James C. McAdams, Langlois, Oregon. Operators: Austin McAdams, Langlois, and John E. Winters, Bandon, Oregon.

Location: Sec. 20, T. 30 S., R. 14 W., on Bethel Creek, at the Coos-Curry line, about $2\frac{1}{2}$ miles easterly from Langlois.

History: It is reported that, during the first World War, 50 - 100 tons of ore running 47 percent manganese was shipped.

General: Manganese oxide concentrations, usually in the form of nodules and small masses associated with chert, are found in the Myrtle formation.

Hodge, 37:18 reports as follows:

"This prospect is located on the Coos and Curry County line in sec. 20, T. 30 S. R. 14 W., 19 miles by road north of Port Orford and 2.5 miles east of the Roosevelt Highway on property belonging to Mr. McAdams. Pyrolusite float is found with chert on the western slope of a ridge over an area 1000 feet long and 200 feet wide, but none was found in place. Bedrock was struck in one trench. Sandstone and schists crop out on either side of the deposit. It is reported that between 50 and 100 tons of 47 percent manganese ore were shipped during war time (1917-18). It is estimated that about the same amount of ore is still on the property".

"Float sampled over the entire area--about 50 yards square, was analysed with the following results: SiO_2 : 14.07%, Fe_2O_3 : 4.97%, P_2O_5 :----, MnO : 63.84%, Undetermined: 17.12%, Total: 100.00%; Moisture: 0.54%."

In the late summer of 1941, Austin McAdams and John E. Winters shipped two carloads of manganese ore. The ore was trucked to Coquille and shipped by rail from there. The carload shipments averaged 45%-49% Mn.

Development: Three pits have been opened from which manganese ore has been removed.

Geology: The Port Orford geologic map (Diller, O3) shows the area to be underlain by Myrtle formation (Franciscan? Jurassic) in which lenses of chert occur. Small basalt outcrops are prominent. The area is deeply dissected and the hillslopes average 40°. Slumps and landslides are common.

Manganese is associated with the chert, sometimes as a stain, sometimes as rhodonite, and occasionally as boulder like masses of oxide that may show alteration from rhodonites. At the McAdams ranch the manganese ore, psilomelane, is found in "chunks" and small masses, usually in the loose rubble above a sandstone bedrock, and particularly along stream courses. In November 1941, development had not preceded to a degree that would permit a definite statement as to whether or not the ore may be found below the sandstone. In color the high-grade ore is steely black and is quite hard. Much of it is solid oxide but many chunks show the presence of rhodonite.

Development to date has exposed ore that apparently has slumped from a higher source. Manganese float is abundant and it is probable that a sizeable tonnage may be accumulated from these occurrences. The presence of rhodonite indicates that oxide ore would not persist with depth, even if the "ledge" is found.

The general area is worthy of careful prospecting. A considerable tonnage of ore can probably be found although the deposits are susceptible only to small scale mining.

Informant: Austin McAdams and Ray C. Treasher, November 27, 1941.

Report by: Treasher 11/29/41.

STATSMAN MANGANESE

Beach Area

Manganese oxides occur in pods and kidneys, similar to the McAdams locality. Some of the Pods contain high-grade ore. None are large and there is no known way of predicting their occurrence. One outcrop in particular, consists of Myrtle(?) formation, heavily manganese stained, with concentrations of manganese oxides in small pods. It is probable that careful prospecting would reveal a small quantity of high-grade manganese pods which could be removed at a profit. No development work has been done.

Owners: R. G. McKenzie, Sixes, Oregon, and Hal Statsman, Box 861, Langlois, Oregon.

Location: Reported by Statsman as sec. 18, T. 30 S., R. 14 W. However, the topographic map indicates an error in this location, which must be in the gulch of an unnamed stream that flows into South Fork of Fourmile Creek, and the location would be NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 29, T. 30 S., R. 14 W., and about $\frac{1}{2}$ mile south of the McAdams ground.

Area: Deeded land.

Geology: According to (Diller, 01) the country rock of the area is Myrtle formation, now provisionally correlated with Franciscan. Small pods of chert and amphibole schist occur throughout the formation. The manganese oxide pods, which vary in size from a few pounds to several tons, have a rude alignment that suggests bedding deposition. Insufficient development work has been done to prove, or disprove, this assumption.

The particular outcrop visited in May, 1941, consists of a weathered rock presumed to be Myrtle formation. The rock stands as a 100-foot cliff above the stream canyon, with a width of about 75 feet. The rock is heavily stained with black oxides on joint and fracture planes, and in many places there are small concentrations which are high-grade, often above 50 percent, manganese.

The outcrops suggest that the ore consists of more or less isolated pods of high-grade ore in a heavily manganese stained rock. Development work for commercial ore should consist of, first, locating a few high-grade pods, and then following a northeasterly trend in scouting for more pods. It is doubtful if any large tonnage is available, yet a sizeable amount of ore might be found as a result of careful and systematic prospecting.

Informant: Hal Statsman & Treasher, May 21, 1941.

Report by: Treasher 5/22/41.

(37)

ALEC CARTER PROPERTY

Beach Area

Manganese stained chert, but no manganese ore was found at this locality.

Authority: Hodge, 37:20 quoted as follows:

"Manganese was reported on the Alec Carter farm in the SW $\frac{1}{4}$ sec. 17, T. 30 S., R. 14 W., Coos County, 18.5 miles north of Port Orford by road. Manganese-stained chert but no manganese ore was found."

Curry County

(38)

NEWHOUSE MANGANESE

Sixes River Area

Location: SW $\frac{1}{2}$ sec. 23, T. 31 S., R. 15 W., about 2 $\frac{1}{2}$ miles south-southeast of Denmark.

Area: 40 acres of deeded land.

History: During 1918 about a carload of manganese was taken to the dock at Bandon, where it remained.

Development: Openings consist of an open cut about 20 ft. long, about 5 ft. of underground work, and a 4-ft. pit.

Geology: Country rock appears to be chert, with amphibolite (actinolite?) outcropping a short distance to the east. Manganese oxide, probably pyrolusite, was deposited just on top of bedrock in the lower part of a soil overburden which approximates 6 ft. in depth. There appears to be no continuity to any of the manganese concentrations.

Informants: Mr. Newhouse and Treasher, July 10, 1941.

Report by: Treasher, 7/11/41.

(38a)

CRYSTAL CREEK MANGANESE

Sixes River Area

A small deposit, prospected by two short tunnels, showed manganese disseminated through chert. The chert lens has an approximate outcrop diameter of 600 feet. Some work was done during the first World War but no ore was shipped.

Authority: Hodge, 37:17 quoted as follows:

"This deposit is located on property owned by Katherin Nodine in sec. 26, T. 31 S., R. 15 W., 10 $\frac{1}{2}$ miles by road northeast of Port Orford. The prospect is located on top of the ridge west of Crystal Creek (elev. 600 ft.). A trench with two short tunnels leading from it was dug in 1917 but no ore was shipped out. The manganese occurs in a siliceous chert lens which is associated with conglomerate and sandstone. The surface outcrop of the lens is round, with an approximate diameter of 600 feet. From all indications the deposit is quite shallow. Within the tunnels the manganese as wad or psilomelane was found disseminated through chert in thin seams and along fractures. A few pieces of pyrolusite float were found around the trench, but none were in place. The deposit is small, very siliceous, and contains no commercial ore".

(38b)

MADDEN BUTTE PLACER

Sixes River Area

A marine terrace deposit, north of Port Orford, worked many years ago for gold was reported to contain manganese. Hodge (37:20) gives the following description:

"A placer deposit rich enough in manganese ore to be worked was reported 7.7 miles north of Port Orford on the east side of the Coast Highway (U.S. 101) in sec. 34, T. 31 S., R. 15 W. Examination showed this report to be unfounded".

(38c)

CLAPSHAW MANGANESE

Sixes River Area

Little information is available, other than that some prospecting was done during the first World War.

Owner: Mrs. Pearl S. Clapshaw, Route 2, Box 101, Oregon City, Oregon.

Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 35, T. 31 S., R. 15 W., Curry County. A road reaches within 300 feet of the deposit.

Miscellaneous Information: 40 acres of patented land. This property was opened up in the spring of 1918 and worked in a small way until November of that year.

Informant: Mrs. Clapshaw; J. E. Morrison, 1938.

(39)

IRON MOUNTAIN MANGANESE

Powers Area

A 50-foot tunnel near a serpentine contact shows manganese oxides in joints and crevices. Float, over an area 1000 ft. by 2000 ft., shows manganese oxides. No rhodonite was seen. The character of the deposit suggests superficial deposition.

Authority: Department Bulletin 14-C, Vol. 1, page 42:

Operators: Lou Royer, Coquille, Oregon; E. W. Spencer, Grants Pass, Oregon, and W. H. Peters, Portland, Oregon.

Location: Secs. 13, 14, 23, 24; T. 33 S., R. 12 W., 21 miles from Powers.

Area: Ten claims, approximately 150 acres.

History: Some work was done in 1918 in prospecting for gold. Since then the property has been idle.

Development: One tunnel, 50 ft. long, caved about 25 ft. from the portal.

Description: No equipment; elev. 3500 ft; steep mountain sides; can be worked all year; requires 3 miles of road to connect with forest road at Rock Creek at an estimated cost of \$3000; adequate timber and water on property; maximum snowfall, 5 ft.

Geology: Very near the east boundary of the deposit, there is a contact between manganese-stained rocks and serpentine. The exact location of this contact is not visible due to a covering of debris. To the west the manganese stained rocks gradually give way to diabasic rocks. There are occasional pieces of manganese float. The tunnel is near the edge of the deposit. Pieces of float near the center of the deposit without manganese minerals on the freshly broken surface indicate superficial concentration.

Informant: J. E. Morrison, 1937.

(40)

MANGANESE PROSPECT

Agness Area

A "manganese ledge" that strikes N. 50° E., crosses the Rogue River about 3 miles west of Agness. The "ledge" is not over 5 ft. wide, and samples indicate a manganese content not to exceed 10 percent. The "ledge" can be traced for a quarter of a mile and is reported to continue for a long distance.

Authority: Department Bulletin 14-C, Vol. 1, page 52.

Located at Copper Canyon or Painted Rocks at a point three miles of trail down the Rogue River from Agness. A manganese ledge which strikes N. 50° E., crosses the river at this point.

Near the water level a tunnel now caved was driven on the deposit many years ago. A big boulder outcropping near the portal was sampled and yielded 9.6 percent manganese. This ledge can be traced up the mountain a distance of one-fourth of a mile; and seven or eight hundred feet above the river near the top of the ridge another sample of the ledge representing about a two-foot width was taken which contained 9.4 percent manganese. According to Walter Fry this manganese ledge can be traced for a long distance to the northeast. It has an average width of not more than five feet.

Informant: J. E. Morrison, 1938.

(41)

IRON HILL GROUP

Agness Area

Claims on Wake-Up-Riley ridge show manganiferous magnetite that assays up to 12½ percent manganese. In 1916 there was one open cut on the property. The manganiferous magnetite is cut by quartz seams.

Authority: Parks & Swartley, 16:132 quoted as follows:

"The Iron Hill group includes all the claims on the 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 percent iron, 12.50 percent manganese, 0.72 percent phosphorus, 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 percent iron, 7.30 percent manganese and 0.56 percent phosphorus, and no titanium, arsenic, copper, or sulphur."

(42)

LLOYD MANGANESE

Gold Beach Area

Black manganese oxides outcrop on a hillside a short distance above a county road, over an area ten feet square. There are float boulders and chunks of manganese oxides scattered over the hillside, and it is reported that additional outcrops may be found farther up the hill. No development work has been done.

Owner: Lloyd Corporation; S. O. Newhouse, Wedderburn, Oregon is the local representative.

Location: SE₄¹ NE₄¹ sec. 29, T. 36 S., R. 14 W., south of county road on the south side of the Rogue River.

Area: Deeded land.

History: This land was part of the McCleay Estate, and was sold recently to the Lloyd Corporation. No work has been done on any of the manganese outcrops.

Geology: The area is heavily covered with brush and grass. It is probable that the deposit is in Myrtle? (Franciscan) formation. At the outcrop, three masses of manganese oxides mixed with some chert, were found. The total amount exposed would be about 30 cubic feet. The only suggestion of additional manganese is in "float" found in the grass.

The type of manganese seems to be similar to that at the McAdams locality, and the same prospecting conditions would hold, namely searching for individual pods of manganese, removing them, and then searching for others. There would be no large tonnage in any one pod, but the total might be a material amount.

Informant: S. O. Newhouse & Treasher, May 22nd. 1941.

Report by: Treasher 5/22/41.

(43)

SIGNAL BUTTE MANGANESE

Gold Beach Area

Ore is exposed over an area 20 ft. by 8 ft. The ore is shiny, light, and soft with a brown streak. About 400 cubic feet of ore is piled on the dump.

Location: Center sec. 21, T. 36 S., R. 13 W.

Authority: Private report (J.E.A.), 1936.

"Location: center sec. 21, T. 36 S., R. 13 W. The body of ore extends north-south for about 20 feet averaging 8 feet in width. About 400 cubic feet piled on dump. Shiny as anthracite, but light, soft, with a brown streak. Lies between north-south band of chert on the east and serpentine on the west."

(44)

HARDENBROOK MANGANESE

Gold Beach Area

Pyrolusite float, but no ore in place, was found among outcrops of chert and serpentine.

Authority: Hodge, 37:20.

"The Hardenbrook Ranch is located in Curry County in sec. 34 & 35; T. 38 S., R. 14 W., two miles north of Carpenterville by road. In this area a small amount of scattered pyrolusite float was found among outcrops of chert and serpentine.

The dump of a caved tunnel, probably 25 to 30 feet long, was all in serpentine and showed no manganese. The pyrolusite float probably came from small eroded bodies within the chert. No evidence of mineable ore was found".

(45)

LAWRENCE MANGANESE

Gold Beach Area

Thin layers of pyrolusite were found interbedded with chert in a small outcrop.

Authority: Hodge, 37:20.

"This location is in SE $\frac{1}{4}$ sec. 10, T. 39 S., R. 14 W., one mile southwest of Carpenterville. It includes serpentines and small area of folded cherts and shales. Thin layers of pyrolusite were found interbedded with chert in an outcrop about four feet wide. The deposit is of no economic value".

(46)

COLGROVE MANGANESE

Chetco Area

One or more chert layers, having a north-northeast trend, contain pods of manganese oxides that outcrop over a wide area. Little prospecting has been done and the general situation is similar to that at the McAdams locality. Assays indicate that the ore is lower in grade than the McAdams.

Owner: Delmar Colgrove, Brookings, Oregon.

Location: South part of T. 39 S., R. 14 W., and north part of T. 40 S., R. 14 W., on the Colgrove Ranch along Whalehead Creek between Highway 101 and the Ocean.

History: Occurrence of manganese oxides on this property have been reported for many years. Various prospectors have submitted samples for assays and in the spring of 1941, M. T. Edwards and associates had a bulldozer employed in doing a small amount of exploration work. Little manganese ore was uncovered.

Geology: The principal rock exposures are in the Myrtle formation (Diller, 01) (sediments containing bands of radiolarian chert). A dike with a north-east trend cuts through the Ranch and most of the manganese outcroppings are northwest of it.

Many manganese outcrops are found in this locality. They are small and well concealed by brush and soil. The manganese is generally lower in grade than at the McAdams locality.

Little information on the quantity of ore available can be obtained until more prospecting work is done. It appears that the most practical method of operation will be to dig out each outcrop, in order to determine if possible any trend or sequence of the pods. It is possible that a sizeable tonnage may be secured from the total number of pods.

Assay results obtained at the Grants Pass State Assay Laboratory follow:

<u>No.</u>	<u>Manganese</u>	<u>Insoluble</u>
Z-626	7.4 %	
Z-235	0.8 %	
Z-236	32.4 %	
B.G-151	23.6 %	58.4 %
B.G-273	32.3 %	36.6 %

Informant: Treasher, 5/29/41

(47)

LONG RIDGE MANGANESE

Chetco Area

Manganese oxide is exposed about $1\frac{1}{2}$ miles northeast of Long Ridge Lookout station on the upper Chetco River. The outcrop shows about a carload of manganese oxide, samples of which have assayed 52 percent and higher in manganese. "Float", up the hill indicates the presence of more manganese ore. The area is heavily covered with brush and soil which make prospecting difficult. About \$500 would have to be expended for a road. This is one of the better prospects seen.

Owner: Nate Moore, Harbor, Oregon.

Location: SE $\frac{1}{4}$ sec. 14, T. 38 S., R. 12 W., about $1\frac{1}{2}$ miles north-northeast of Long Ridge Lookout station.

History: A number of years ago Mr. Moore discovered the manganese ore while hunting.

Development: The immediate outcrop has been uncovered so that about 40-50 tons of manganese ore are exposed. A bulldozer has brushed out a trail from the Forest Service road northward to the outcrop.

Geology: The area is heavily covered with brush and soil, and rock outcrops are scarce. At the prospect, pieces of manganese oxides, varying in size from that of a walnut to a foot or so in diameter, are found in the soil. These scattered pieces grow more numerous with depth until the ore in place is found.

The manganese ore itself is soft, and probably is mostly pyrolusite with some manganite. The exposed material measures about 10 feet square and 4 feet thick, but when visited, the bottom had not been exposed. It is reported that "boulders" of ore have been found both down-hill and up-hill from the prospect, indicating the presence of additional manganese bodies.

The immediate country rock is chert, enclosed in sandstone. The chert mass seems to have an east-west strike, but dip could not be determined. Another chert mass is found on top of the ridge near the Guard Station; it is manganese stained and some manganese pods may be located.

The manganese ore occurs in pods or lenses, and careful prospecting will be necessary to uncover more lenses. Quantity available is uncertain; about one

fifty-ton carload is in sight and it is reasonable to expect that at least two or three carloads could be obtained from the present prospect. It is probable that more ore will be uncovered at the same place.

Mining Conditions: The outcrop is about $1\frac{1}{2}$ miles north of the Forest Service road and about 600 feet lower in elevation. The hillside is very steep. A truck road to the deposit would probably cost between \$500 - \$1000. About 5 days work should uncover enough manganese ore to indicate whether enough can be found to justify expenditure for development, including a road. The distance from the Lookout to Brookings is 24 miles by mountain road, and it is approximately 100 miles farther to Grants Pass, the nearest railroad point.

Water is scarce. It is about a mile horizontally and 500 feet vertically to the Chetco River. The only water at the prospect is a small spring. Only a small amount of scrub timber would be usable for mining purposes.

Considerable manganese oxide is scattered throughout the loose rubble on top of the manganese masses. It might be feasible to transport some of this to water where the waste could be washed out.

Samples from the deposit have yielded the following results at the Grants Pass State Assay Laboratory:

<u>No.</u>	<u>Manganese</u>	<u>Insoluble</u>
Z-809	52.5	
A.G.1143	58.5	
B.G.466	53.4	3.7
B.G.467	56.4	2.3

Informant: Ralph Moore and Treasher, May 24th, 1941.
Report by: Treasher 5/25/41.

(50)

BLACK BEAR

Chetco Area

Owner: Thomas Cronin, Crescent City, California.

Location: N $\frac{1}{2}$ sec. 14, T. 41 S., R. 11 W., about one mile S. of Sourdough Camp.

Area: Three claims, held by location, recorded at Gold Beach, Oregon.

History: Known as the Black Beauty during the World War, at which time some ore was shipped from this property.

Development: 20 feet of adit and numerous cuts, done during the 1918 activity. Assessment work only has been done since then. There is a road to the property.

Geology: Country rock, Dothan slates. Ore is reported to assay from 20%--70% manganese oxide.

Informant: Thomas Cronin, March 27, 1940.

The following brief report was written many years ago by John H. Maxson, geologist, now at California Institute of Technology, Pasadena. The present owners are G. T. Lewis, 5935 N. E. 16th Ave., Portland, Oregon, and associates.

"This is located on the east side of the north fork of Smith River, at an elevation of 1400 feet; it lies in southeastern Curry County about one mile north of the State line. It was located in 1918 by John Taggart, James Keaton, and Reeves Costello and relocated in 1924. Its present ownership is in doubt. The deposit appears to be a replacement body along a brecciated zone in Dothan chert and jasper.

"The surface outcrop on the slope of the hill is 65-70 feet in width and runs 150 feet or more in a direction N. 35°W. The ore minerals are pyrolusite and manganite. The oxidized zone extending to the depth of exploration (15 feet) has considerable wad. The gangue consists of suspended chert fragments and porous silica. The ore is reported to be of high grade, namely 72% manganese dioxide, but so far as may be seen from the exploration such high-grade ore occurs only in small masses; with depth, however, the chances for high-grade ore appear good. The development is small and consists of a cut and tunnel extending 30 feet to the east from the face of the hill; one short cross-cut extends to the north of the open cut. Observation indicates that the orebody dips about 60° southwest. A cabin has been built south of the workings."

Ref: (Oregon Metal Mines Handbook-bull. 14-c Vol. 1. page 56, 1940. State of Oregon Dept. of Geology and Mineral Industries.

Douglas County

(51) and (52)

Two deposits are noted in the text by Pardee (21:212) and located on the map (Fig. 36). No description or exact location is given.

Lane County

(53)

SAGINAW

A deposit is noted in the text by Pardee (21:212) and located on the map (Fig. 36) as being "east of Saginaw, Lane County".

The tabulation in the Appendix contains assay results together with descriptive matter on one sample from Lane County submitted to the Grants Pass Laboratory.

Polk County

(54)

DALLAS MANGANESE

Polk County

Owners: Messrs. McManners and E. G. Kingwell, 615 N. 14th, Salem, Oregon.

Area: 360 acres under lease and option from Hawkins (60 acres) and Siddons (300 acres); 100 acres under option.

Location: N.W¹/₄ of sec. 36, T. 7 S., R. 6 W. Exposed only in the bank and the bed of Rickreall Creek.

Geology: Rickreall Creek flows over fine to coarse-grained yellow, gray, and green tuffs, which at the locality are well bedded, but to the west are quite massive and even-grained. Near the deposit the coarse-grained (2-5 mm.) bands, from 6 inches to 18 inches thick, form ridges which stand out from the medium grained ($\frac{1}{8}$ to 1 mm.) bands, from 1 to 2 feet thick. The coarse-grained beds are reddish in color, nearly all the medium and fine-grained tuffs are greenish or gray. At the locality the tuffs strike N. 80° E., and dip 15° W.; 100 yards upstream to the west they strike nearly north-south and dip 5° east; 50 yards farther upstream they are nearly horizontal. Two major jointing systems in the tuff strike N. 25° W.; one dips 30° E. and the other is vertical.

The tuffs are intruded, at the locality, by dense fine-grained black basalt, the contact being quite irregular, and the basalt at time of intrusion being highly brecciated in places along the contact. Downstream from the locality, the creek flows over basalt.

The north side of the creek consists of a steep 20 foot bluff of gravels, forming a relatively level terrace, which is from 50 to 200 feet wide and over half a mile long. A similar less well-developed terrace appears on the south side of the stream, but the bluff is lacking on this side. Beyond the terrace on the hill-sides both upstream and downstream from the locality the only rock that appears is basalt.

Near the contact of the basalt and breccia with the tuff, the latter is cut by thin veinlets (less than $\frac{1}{8}$ inch thick) of a manganese mineral (hausmannite?), which, when they penetrate to the coarse-grained beds of tuff, spread out and disseminate into the interstices between the tuff grains to form the matrix between the angular fragments. The coarse beds contain from 10 to 14 percent manganese. Samples taken returned the following results:

Coarse red tuff:	<u>Mn. %</u>
PA 7 across 14"	10.56
PA 11 across 6"	10.69
Grab sample of high grade:	
PA 12	14.97
Mixed red and gray tuff:	
PA 8 across 16"	4.45
PA 9 across 15"	.53
Gray shaly tuff:	
PA 10 across 30"	.48

Economic Considerations: The length of the exposed outcrop is about 20 feet, the average thickness over that length not over one foot, of ore that will run 10% mn. The outcrop is irregular, and if it were to be followed, no consistency of thickness or direction can be expected, due to its mode of origin and the extremely sinuous contact of the basalt with the tuff.

Informant: Allen 8/12/41

Marion County

(56) DETROIT

This deposit is noted in the text by Pardee (21:212) as "Near Detroit, Marion County", and is located on map (Fig. 36).

V. MANGANESE IN EASTERN OREGON

by

John Eliot Allen

Introduction

The distribution of manganese minerals of possible economic value is less widespread in eastern Oregon than in the southwestern part of the State. All but a few of the known deposits are found in central Baker County included within a circle with a radius of seven miles centered halfway between Pleasant Valley and Durkee. These occurrences are associated with cherts of Paleozoic age. Just west of Unity, southern Baker County, manganese is found in a pumice deposit. Two other deposits occur in tuff and rhyolite of early Tertiary age, 15 and 20 miles north of Burns in north-central Harney County; one occurs in chert 25 miles southwest of Canyon City on a branch of Murderers' Creek in southwestern Grant County; and two occur in rhyolite and tuff ten miles north of Hampton in southeastern Crook County.

Baker County

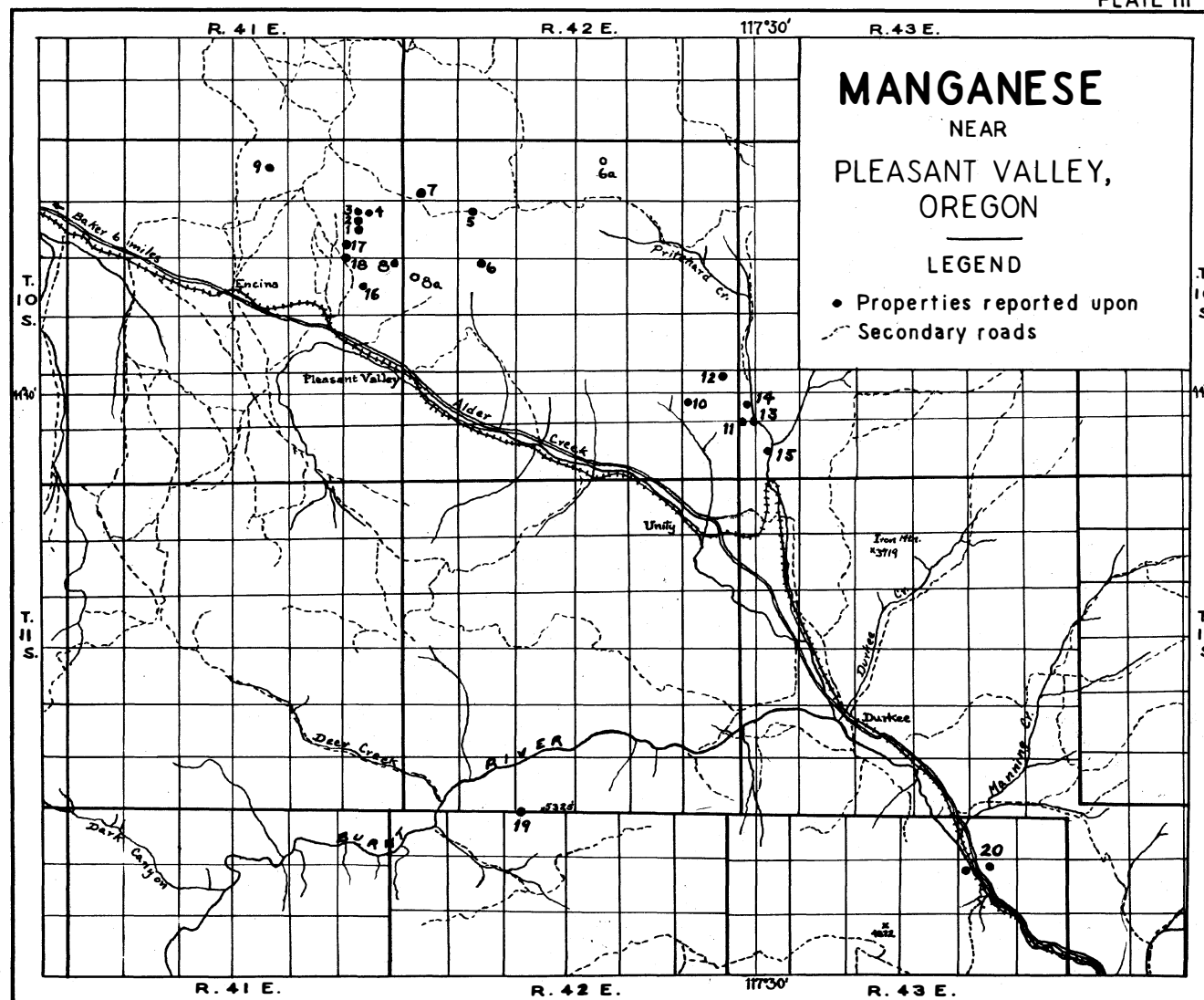
Pleasant Valley Area: According to Pardee, 21:213-214:

"Deposits near Pleasant Valley and Durkee, Baker County, are tentatively classified as resulting from replacement of the country rock by carbonate or silicate minerals that have become wholly or partly oxidized. They consist of irregular veins, lenses, and podlike bodies in siliceous argillite and limestone of Paleozoic age. Though their exposed parts contain oxide minerals, only their cavernous texture and some other features suggest that before oxidation they were dense bodies of carbonate and silicate minerals.

"The most abundant manganese minerals seen are pyrolusite, psilomelane, and manganite. There is more or less soft pulverulent oxide, of which part appears to be wad and part is an unidentified greasy-lustered brown mineral. Fine-grained quartz is abundant, and kaolin is common. Iron oxides are abundant in one deposit but rather scarce generally. Several of the deposits are said to contain a little gold and silver, and some of those near Pleasant Valley contain a little tungsten.

"The bodies under consideration are similar in many features and are therefore thought to be similar in origin to the metalliferous quartz lodes of the surrounding region, which are generally regarded as deposited by solutions ascending from some intrusive body. A shade of doubt is cast over this interpretation by the fact that many of the deposits are aligned with the general strike of the rocks, as if they were confined to a certain stratum and might therefore be of sedimentary origin. However, no other evidence to support such a conclusion was found.

"Practically no ore reserves are developed, but a rather large amount of highly siliceous manganiferous material that may be capable of beneficiation is in sight or in prospect.



"Location and Accessibility: Manganiferous deposits are found at several places near Pleasant Valley station on the Oregon-Washington Railroad & Navigation Co's. line, in an area that lies from 12 to 20 miles southeast of Baker and can be easily reached from that place by automobile. From Pleasant Valley the Stephens and Capitola groups of claims are respectively 2 miles and 3 miles north, the Black Prince group and the Black Nigger claims, respectively, 2 miles and 5 miles northeast, and other claims from 4 to 7 miles east. The Stephens and Black Prince groups and several of the other claims are distributed along a belt that trends about N. 60° W. This belt is approximately parallel to the valley of Alder Creek, through which the railroad goes, and from 1 to 2 miles northeast of it.

"Production: Most of the claims were located prior to 1917 for gold and silver though very little development work was done on them. In 1917, according to reports, 450 tons of manganiferous material was produced from the Utah claim of the Stephens group. Most of this material was shipped to Tacoma and after being reassorted yielded about 300 tons of 40 percent manganese ore that was used in making ferro-alloys. The Utah and other claims in the Stephens group were idle when visited by the writer, September 4, 1917. Development workings on the Utah had reached a depth of 45 feet; elsewhere they consisted of shallow pits. No production was reported in 1918.

"Occurrence of Tungsten: One feature of the Pleasant Valley deposits of more than ordinary interest is the association of tungsten with manganese as reported by Emil Melzer, of Baker, Oregon, who acquired control of the claims late in 1917. According to Mr. Melzer, a sample composed of material from four different bodies was tested for concentration by the Hendrie-Bolthoff Co., of Denver, Colorado, the assays being made by E. E. Burlingame & Co. Of several different concentrates produced, one that represented the final product and amounted to 3.69 percent of the composite sample carried 23.62 percent of tungstic acid (WO_3). This is equivalent to about 0.75 percent of tungstic acid in the crude ore. Whether the tungsten came from one or all of the four different deposits represented by the sample or in what proportion from each was not determined, and the tungsten-bearing mineral was not identified.

"Surface Features: The area through which the deposits are scattered has a general southwesterly slope toward Alder Creek and is crowded with ravines and small narrow valleys that range from 200 to 600 feet in depth. The sides of the valleys are rather steep, and the intervening summit areas flat or gently sloping. The altitude of Pleasant Valley is about 3,800 feet, and summits to the east are from 500 to 1,000 feet higher. Locally water is scarce, timber is absent, and the dominant vegetation is of the sagebrush type.

"Rock Formation: The prevailing rocks are thin-bedded gray argillite and cherty-appearing shale, with isolated lenses or blocks of crystalline limestone here and there. The whole forms part of a group of rocks that are

extensively developed in the surrounding region and are probably of Carboniferous age. They have undergone extreme deformation, as shown by the steeply inclined attitude of the beds, the multitude of small compressed folds, the erratic distribution of the limestone blocks, and the alteration of what were originally shale and limestone to argillite and marble. The general trend of the folds is about N. 60° W. In places, especially on the flat summits, these rocks are deeply weathered to a mantle of fine clayey soil that contains numerous fragments of the more resistant cherty or siliceous layers. Here and there the rocks and their residual mantle are overlain by gently inclined beds of lava and fresh-water sediments of Tertiary age.

"Ore Bodies: The ore bodies are of moderate to small size and irregular form. Most of them are found near the surface along bedding planes or joints in the argillite and are associated with tabular or lenslike masses of fine-grained quartz. Ore obtained from them, even by careful mining, runs high in silica. The sample of crude ore reported by Mr. Melzer assayed 36.06 percent of manganese, and the concentrate produced by reducing it about one-half contained 48.28 percent of manganese, 13.40 percent of silica, and 0.124 percent of phosphorus. The largest body found on the Utah claim is in general terms a flat lens 20 feet wide (stope length), 30 feet long (pitch length), and 5 feet thick in the middle. It extends from a point near the surface downward along a wavy gouge-lined bedding plane or seam that has an average dip of 20° E. Several smaller lenses are found below it to a depth of 60 feet on the slope, which is the limit of exploratory work. The ore is rather soft and cavernous and is composed chiefly of manganese oxides, clay, and quartz. The oxides are apparently an intimate mixture of pyrolusite, psilomelane, and wad.

"About 200 feet east of the deposit just described other bodies are developed by a 25-foot shaft, from which a drift runs east 63 feet and ends in a winze inclined southwestward 30 feet deep. Water stands in the bottom of the winze, at a level estimated to be about 45 feet below the surface. The shaft penetrates an irregular cylindrical body about 10 feet in diameter and 15 feet long, composed chiefly of quartzose or silicified argillite.

"A small part of it is made up of indistinct veinlets and bunches of manganese oxides, among which pyrolusite and manganite were identified. The body is cut by a few stringers of a coarser-textured quartz with manganese oxides, and from its lower end several seams filled with manganese oxides and clay lead off along bedding planes. The drift follows a seam that is normally 2 or 3 inches wide but swells here and there into bunches or pockets, the largest of which is 5 feet in diameter. Another seam with several small pockets is developed by the winze. Ore from these pockets is said to carry from 35 to 45 percent of manganese and 20 to 30 percent of silica and to be practically free from iron. A shallow cut 20 feet west of the shaft exposes an 18-inch vein of flinty-textured quartz and manganese oxides that dips 50° NE.

"On the Black Joe claim about half a mile southeast of the Utah, a body of flinty-textured quartz with manganese oxides is exposed by shallow workings for a distance of 50 feet. This deposit is of tabular or vein form, is 4 feet wide, and strikes about east. Seams and small cavities in it are filled with the softer manganese oxides.

"Outcrops of many bodies similar to those in the Utah and Black Joe are reported in an area that extends from the vicinity of these claims southeastward for 6 or 8 miles. None are extensively developed. Several in the Capitola

group of claims are said to occur in the limestone and to be high in iron. A body of manganiferous quartz 10 feet wide is said to form a prominent outcrop on the Black Prince claim.

"The manganese oxides were probably derived from rhodonite and rhodochrosite. Oxidation of the rhodochrosite was accompanied by shrinkage that gave the ore its cavernous texture. The distribution of the siliceous manganiferous bodies for several miles along a course that coincides with the general strike of the bedded rocks suggests that they are of sedimentary origin. On the other hand, the presence of vein quartz and the reported occurrence of small amounts of gold, silver, and tungsten indicate that they are similar in origin to the metalliferous quartz lodes of the surrounding region, which are believed to have been deposited by solutions ascending from some deep-seated intrusive rock.

"No good basis exists for making an estimate of ore in reserve. Probably, however, small amounts that contain 35 percent or more of manganese are to be found, together with a comparatively large amount of highly siliceous material which is rather poor in manganese but which may possibly be capable of beneficiation."

Properties described above have been tentatively correlated with the following departmental reports:

	Map and Report No.
Stephens group	
Utah.....	8
Black Joe.....	(not visited) 8a
Capitola group.....	7 (?)
Black Prince.....	6
Black Nigger.....	(Not visited) 6a

The manganiferous deposits of the Pleasant Valley Area are located two to four miles east of U. S. Highway 30 and from 12 to 30 miles south of Baker. All of the deposits are accessible by automobile from U. S. Highway 30, which they roughly parallel. Numbers refer to locations on Plate III.

One group of claims is owned by A. L. Fugit, Merle Fugit, and Harley Haskins of Pleasant Valley, and the other by Carrol H. Kipp and Harry Donovan of Baker.

(1)

NO NAME:

NW $\frac{1}{4}$ of sec. 12, T. 10 S., R. 41 E. Elevation (by aneroid) 4020 ft. A shaft 15 feet deep between two limestone lenses, shows no manganese stain or ore.

(2)

BLACK BIRD #1 CLAIM

Owner: A. L. Fugit.

Located one-fourth mile north of (1), on the SW side of a NW trending ridge.

Elevation 4130 feet. A lenticular chert zone partly replaced by manganese oxides strikes about N. 70° W. and apparently dips about 45° to the north. One large cut 10 ft. wide and about 10 ft. long exposes ore which occurs over a distance of several feet. Small pits along the zone for several hundred feet suggest a possible extension, but this has not been proven. The manganese is medium to low in grade, is highly siliceous, and contains much yellow limonitic material. A sample from the location pit ran 20 percent manganese.

(3)

BLACK BEAUTY CLAIM

Owner: A. L. Fugit.

Located 200 yards to the north of (2) on top of ridge at elevation 4200 ft.

A pit 4 ft. square and 2 ft. deep exposes 4 ft. of manganite in lenticular chert. Strike N. 60° W. dip 65° SW. Sample from this location returned 44 percent manganese.

(4)

BLACK BIRD #2 CLAIM

Located about one-fourth mile easterly from (3) in west wall of gulch. Elevation 4020 ft. A well-defined outcrop of lenticular chert strikes N. 70° W. and dips 70° North. It is altered and replaced by manganese oxide only on the outside of the chert blocks. Pieces are black, indicating high grade manganese ore but when broken they show plainly that replacement by manganese oxide has been incomplete. This band of chert is up to 10 feet in width and at least 40 feet in length. Sample from location pit returned 21 percent manganese.

(5)

MANGANESE #5 CLAIM

Owner: A. L. Fugit.

Located in the NW $\frac{1}{4}$ of sec. 8, T. 10 S., R. 42 E.; 100 yards S. of the summit of the hill on old road. A shaft was sunk and several open cuts were excavated at this point; 200 yards to the southeast across the creek there are four other open cuts. The only ore consists of crusts and thin stringers of manganese oxide in chert or other siliceous material which appears to strike N. 40° W. A sample returned 12 percent manganese.

(6)

BLACK PRINCE CLAIM

Located in center of N $\frac{1}{2}$ of sec. 17 on summit of ridge. Two large, shallow diggings have exposed manganese ore along the top of the ridge for about 75 feet in east-westerly direction. The manganese is of high grade and is not as siliceous as that in most of the other localities. This property should be developed further.

(6a)

BLACK NIGGER

Pardee (21-224) See quotations given above, p. 47. Not visited.

(7)

MANGANESE #3 CLAIM

(This may be the Capitola Claim of Pardee, 21:224.)

Owner: A. L. Fugit.

Located near the north line of sec. 7, $\frac{1}{4}$ mile W. of main road on spur.

Apparently considerable work was done here in the past, but no ore of shipping grade was seen when visited. The bands of chert are only slightly altered and replaced. A sample of manganite interbedded in chert returned 11 percent manganese.

(8)

UTAH CLAIM

Located in NE $\frac{1}{4}$ of NE $\frac{1}{4}$ sec. 13. (This is the Utah claim noted by Pardee, 21:226, from which 450 tons were shipped). Two shafts, apparently developed some ore, but the main workings consist of a stope to the northwest down about 60 feet in an ore body which was from three to five feet in thickness and from 20 to 30 feet in length. The ore consists of replacements in gray, cherty material. There are further openings to the southeast across the gulch.

(8a)

BLACK JOE:

Pardee (21:226). See quotations given above, p.47. Not visited.

(9)

BLACK CAPS LODE CLAIM (Foster Claims)

Owner: R. S. Foster, 1118 Resort Street, Baker, Oregon.

Located about $\frac{1}{4}$ mile due south of Last Chance Quartz Claim, in sec. 3, T. 10 S., R. 41 E. W.M. One claim running N. 60° W., was located August 28, 1938. Country rock composed of banded lenticular cherts, interbedded with shale, more or less replaced and impregnated with manganite and other manganese oxides. Considerable clay-like and soap-stone-like material accompanies the ore as well as light yellow limonite stains. Ore can be sorted to 30-45 percent manganese. Mine run would be very low.

Banded chert bedrock strikes N. 60° S. Ore apparently has similar attitude and is at least 4 ft. wide, being exposed for 20 ft. with a depth of at least 5 ft. Some of the shale interbeds are partially replaced to give a black manganiferous shale. The ore is somewhat faulted and displaced. Several small open cuts and one trench about 20 ft. long have been made, but with one exception nothing but float is exposed in any of these cuts. At a point 100 ft. north of the SW corner post near the bottom of the gulch an inclined shaft trending southwest and sloping 35 degrees has been driven on a quartz vein 1-2 $\frac{1}{2}$ ft. wide for a distance of 200 ft. This persistent vein was sampled but showed no values of importance. There is no timber on the property and little or no water. The railroad is 3 miles distant by dirt road. (Report by: Allen, 10/7/38.)

(10)

JAY BIRD CLAIM

Owner: A. L. Fugit.

Located 2 $\frac{1}{2}$ miles north of Oxman Siding, near the center of the W $\frac{1}{2}$ sec. 25, T. 10 S., R. 42 E. Manganese oxide occurs in a bedded deposit striking N. 50° W. and dipping 20° W. The outcrop near the surface appears to be a glaze or stain. Better grade of manganese is exposed 4 feet below surface near the bottom of the location pit. Manganese occurs as manganite and is associated with limonite, quartz and minor amounts of chert. The location pit 3 ft. by 4 ft. by 4 ft. deep and another pit, partially filled, located 25 feet west of the location pit, constitute the total work on the claim. Sample from the location pit ran 41 percent manganese.

(11)

SEMINOLE CLAIM

Owner: A. L. Fugit.

Located approximately 3 miles northeast of Oxman and 3000 feet east of the Jay Bird, near west corners of secs. 30 and 31, T. 10 S., R. 43 E. Six feet of a 14-foot outcrop is siliceous manganite. The outcrop is chiefly quartz. Strike is N. 50° W.; dip is 80° SW. No development work has been done. A sample ran 34 percent manganese.

(12)

COLLIE NO. 2 CLAIM

Owners: C. H. Kipp and Harry Donovan.

Located 8 miles NW of Durkee and 3 miles north of U. S. Highway 30 in the NE $\frac{1}{4}$ of sec. 25, T. 10 S., R. 42 E. Location pit filled by grazing sheep. There is no development other than location work.

(13)

CANYON SITE CLAIM

Owners: C. H. Kipp and Harry Donovan.

Located on the edge of a canyon above Pritchard Creek in sec. 30, T. 10 S., R. 43 E. The claim is 3 miles from Oxman and 8 miles N. W. of Durkee. There is a four foot bed consisting of chert, schist, and manganese oxide. A sample taken from this ran 11.9 percent manganese. The manganese showing is exposed by a shallow exploration pit, and appears to dip 40° W. The outcrop could not be traced along the surface.

(14)

SUNSET NO. 1 and NO. 2 CLAIMS

Owner: C. H. Kipp.

Not visited. According to Kipp there is no evidence of manganese. Located northeast of Fugit's Seminole Claim in sec. 30, T. 10 S., R. 43 E.

(15)

JETTA MAE NO. 1

Owner: C. H. Kipp.

Located on Lawrence Creek in sec. 31, T. 10 S., R. 43 E. Location pit 4 ft. by 3 ft. exposes 2 feet of siliceous manganite.

(16)

A AND M CLAIM

Located 2 $\frac{1}{2}$ miles NW of Pleasant Valley in the center of the W $\frac{1}{2}$ of sec. 13, T. 10 S., R. 41 E. Location pit exposes 14 inches of low-grade manganese associated with quartz and chert.

(17)

ANCHORA LELAND NO. 2 CLAIM

Located $\frac{5}{8}$ miles northwest of Pleasant Valley. Manganese oxide in a stringer strikes N. 40° W. A sample assayed 26 percent manganese.

(18)

ANCHORA LELAND NO. 1 CLAIM

Owner: A. L. Fugit.

Located south of Anchora Leland No. 2. A manganese-stained outcrop four feet wide strikes N. 60° W., dips nearly vertical. A sample assayed 5 percent manganese.

Remarks: Very little work has been done on any of these claims. No estimate can be made as to lateral or vertical extent of the manganese bearing zones. A small amount of ore might be mined, but before the Pleasant Valley manganese deposits can become producers, an economical concentration process must be developed.

Report by: Allen 3/26/40 and Lancaster 6/26/41.

(19)

SHEEP MOUNTAIN GROUP

Lower Burnt River Area

Owners: John Arthur, Ed Hendryx, Hal Bradley, and James G. Kidwell, all of Baker, Oregon.

Location & Area: Two unpatented claims, located 8 miles west of Durkee and $1\frac{1}{2}$ miles from Burnt River in sec. 33, T. 11 S., R. 42 E., and secs. 4 and 5, T. 12 S., R. 42 E., W.M.

General Description: The claims lie on Sheep Mountain, steep and uniform slopes of which are covered with a sparse growth of sage brush and grass. Maximum snowfall is about 2 feet. The property is accessible in dry weather by a poor road that runs up Cave Creek. No equipment is on the property.

History: No work has been done on the claims recently. The ground was located by John Arthur about 1918 and sold to a Mr. Quinn. After World War I, the claims were abandoned and were relocated by John Arthur and associates in 1939.

Geology: According to Pardee (21:227):

"An undeveloped lode showing considerable manganese at the surface crops out in the claims located by John Arthur and others near the summit of Sheep Mountain, 7 miles west of Durkee. Sheep Mountain is a massive rounded knob on the ridge south of Burnt River that reaches an altitude of 5,325 feet, or about 2,300 feet above the stream. The prevailing rock is schistose argillite. The outcrop, which is not conspicuous, ranges from 2 to 10 feet in width and extends from a point near the summit S. 50° W. at least 4000 feet down the slope. It consists chiefly of siliceous argillite traversed by small quartz veins, the whole fractured and partly replaced by manganese oxides. Irregular masses of manganiferous material as much as 3 feet wide and 6 feet long appear here and there. These are composed of streaks, nodules, and irregular bodies of psilomelane, pyrolusite, manganite, and wad bound together with a lattice of quartz seams. The body is cavernous, and the quartzose portions show some flattened cavities whose forms suggest they were molded around crystals of a carbonate such as calcite or rhodochrosite. An average sample of material selected in mining is reported to carry 27.62 percent of manganese and 42.48 percent of silica. Possibly it can be beneficiated by ordinary methods of concentration. According to Mr. Arthur, a panning test yielded a concentrate containing 39.68 percent of manganese, 24.60 percent of silica, and 0.052 percent of phosphorus. A small amount of ore is found that runs as much as 48 percent of manganese, with 8 percent or less of silica.

"The general features of this deposit suggest that it is to be classified with the metalliferous quartz lodes that are abundant in the surrounding region, and like them, was probably formed by solutions ascending from some cooling, deeply buried igneous rock."

All of the development work except tunnel No. 2 is open. Analyses at the State Assay laboratory, Baker, of samples taken on the property are as follows:

(Samples taken June 4, 1941)

		Mn
BBF 73	Sample across 10 feet manganese zone 25 feet from portal, tunnel No. 1	30.2
BBF 74	Manganese and quartz from face of tunnel No. 1	36.5
BBF 75	Grab sample from dump at portal of tunnel No. 2	26.0
BBF 76	Sample from pit N 50° E. and 150 feet from tunnel No. 2	18.2
BBF 77	Cut across face of open cut No. 3 (3 feet)	19.1
BBF 78	Two feet of quartz and manganese from pit at N.E. center end line of Claim No. 2	11.4

Report by: Lancaster 6/4/41.

(20)

PRESCOTT CLAIMS

Lower Burnt River District

Owner: Jack Prescott, Baker, Oregon.

Location: Four miles south of Durkee alongside U.S. Highway #30, in the center of the N $\frac{1}{2}$ of sec. 11, T. 12 S., R. 43 E.W.M.

Area: 2 claims--1 patented (600 ft. x 600 ft.), the other full size.

According to Pardee (21:228):

"Manganiferous iron ore is found in the Corander mine, on the steep slope east of Burnt River about 4 miles below Durkee. The Oregon-Washington Railroad & Navigation Co.'s main line, which follows the valley of Burnt River, passes within a few rods of the mine. The development workings consist of adits from 100 to 240 feet in length at levels 300, 420 and 620 feet above the river, made several years ago in a search for gold. In June, 1918, they were being cleaned out and repaired by J. H. Prescott, the operator, preparatory to mining manganiferous ore.

"The rocks are limestone and soft gray argillite that belong to the same group of Carboniferous sediments as the rocks at Pleasant Valley. The strike is about N. 70° W. and the dip 45° N. The argillite is subdued in surface expression, but the limestone shows cliff-like exposures from the river to the top of the slope; the lode crops out on the upper part of the slope and on the summit, about 1,000 feet above the river, where it is a conspicuous ledge 8 or 10 feet high stained black with manganese oxides. It lies between the limestone and the argillite, is 5 to 10 feet wide, and consists mainly of silicified argillite with more or less iron and manganese oxides. This material is sharply separa-

ted from the limestone, which forms the footwall, but it grades indefinite- into the argillite of the hanging wall. The ore bodies range from small streaks to irregular pockets or lenses 3 or 4 feet thick and 50 feet or more in length and are most abundant in that part of the lode next to the limestone.

"The ore is a rather soft cavernous material that commonly shows mamillated and stalactitic forms and consists chiefly of iron and manganese oxides, with more or less quartz and clay. Limonite and wad are the most abundant ore minerals. Cavities are lined with a soft manganese oxide that is made up of very fine brownish-black scales and in the mass has about the luster and color of stove polish. Small bodies of white earthy kaolin or halloysite are found in places adjacent to the ore. No analyses of the ore are available. To judge by its appearance, most of it carries more iron than manganese and is rather high in silica.

"A deposit on the opposite or west side of the river is reported to be developed by shallow workings in which a considerable amount of iron ore and some manganese ore is exposed."

History: The property was opened up during World War I and exploration work only was done. It has been idle since then.

General: Property is on the steep canyon wall forming the north slope of Burnt River. The ground has no timber; water is available in Burnt River which is 200 yards away. Power lines run below the property alongside the highway.

Development: There are 3 adit levels, as follows: upper, 45 ft. of crosscut and 50 ft. drift; intermediate, 110 ft. cross cut, 80 ft drift; lower, 320 ft. to 350 ft. of lateral workings with no definite drifting. A small shaft 25 ft. deep was sunk (now caved) at portal of lower tunnel. There is no equipment.

Geology: The country rock consists of distorted and recrystallized limestones and shales having a general dip of 34 degrees - 36 degrees to the NW. Lenticular masses and "blobs" of manganese oxide occur as replacement along the limestone-shale contact. Surface outcrops of manganese-stained siliceous shale appear as prominent ridges. The upper claim contains one short, very siliceous outcrop with surface extent of 40 ft. x 27 ft. A sample taken over of a distance 15.5 ft. gave 0.75% Mn. Samples over the balance of the surface exposures were poor in manganese. The highest assay was 7.60% of sooty ore. Others were: 3.68% for 4.5 ft. width; 2.3% for 9 ft. width; 0.75% for 10.5 ft. width. Channel samples cut in adit levels were as follows:

Upper tunnel: 4 samples--average 4.5 ft. wide gave 2.13 percent manganese.

Intermediate tunnel: 6 samples--average 3.9 ft. wide gave 3.17 percent manganese.

Lower tunnel: Spotty mineralization. No weighted average.
3 ft. gave 9.30 percent; 3.04 ft. gave 1.63 percent; 2.4 ft. gave 5.33 percent; 6 ft. gave 2.28 percent; Grab samples from exposure at portal gave 5.08 percent manganese.

The highest assay was 9.3 percent out of 23 separate assays and only 7 of the 23 were in excess of 5 percent manganese. Commercial operation of the property would depend upon possibilities of concentrating the ore.

Report by: Quine 4/14/38.

(21)

LADY GROUP

Lower Burnt River Area

Owner: James Berri and John Snyder, Baker, Oregon.Location: North of Nordine Creek about one mile south of N. Daily Creek and three miles northwest of Big Lookout Mountain. (Probably in sec. 27, T. 10 S., R. 44 E.)Area: Four unpatented claims known as Lady Number One, Two, Three, and Four.Remarks: This property was not visited. No development work other than pits sunk in assessment work is reported. Assays on samples brought to the Baker State Assay Laboratory varied from 28 to 48 percent and are given below:

	Date	Manganese
13-#1	11/4/39	39.8%
14-#2	11/4/39	48.7%
16-#1	11/24/39	31.4%
17-#2	11/24/39	39.8%
15-#3	11/4/39	28.5%

Informant: John H. Snyder, Baker, Oregon. Lancaster 7/26/41.

(25)

BLACK CAP GROUP

Greenhorn Area

Owners: H. M. Metz, Frank Miller, Mrs. Frank, 2610 Clark Street, Baker, Oregon.Location: Sec. 10-2, T. 10 S., R. 36 E. W. M.; on Dry Creek about 3 miles northeast of Whitney.Area: Three unpatented lode claims, the Black Cap, Black Cap No. 1 and Black Cap No. 2.History: Ground on west side of Dry Creek, now overgrown with pine trees and brush; was placered in early days.Development: Five shallow cuts spaced about 20 feet apart on the east side of Dry Creek.General Description: The claims are located about 1 mile from a fourth class road and six miles from the main highway. Timber is sufficient for all mining needs and maximum snowfall is about five feet during the winter. No water is available in midsummer.Geology: The manganese occurs in a quartz breccia and as manganese stained quartz. The ground is very badly broken, and no dip is evident except in pit 3 where a quartz vein strikes N. 85° E. and dips 35° to west. Dry Creek exposes quartzite and shale bedrock which appears to dip 40-50° S.Remarks: There is a small amount of manganese present. Picked samples ran as high as 20 percent manganese, but the average ran 4 percent. No gold was found in any of the samples.Report by: Lancaster 6/4/40.

(27)

DERN PROPERTY

Upper Burnt River Area

Owner: Ralph Dern, Unity, Oregon.

Area & Location: Seven unpatented claims located on the ranches of Ralph Dern and Jack Murray. These claims are located 5 miles southeast of Unity on Camp Creek, in sec. 25, T. 13 S., R. 37 E.

Geology: Manganese oxide is found as small nodules sparsely scattered over the hill. One 20° incline shaft runs N. 20° W. into the hill. This shaft is 40 feet deep and follows a 2-foot bed of tuff lying between two gravel beds. Small scattered concentrations of manganese oxide, about 3/4 inches in diameter, are scattered throughout the tuff. A sample from this bed ran 10.2 percent manganese. On either side of the tuff the gravel beds contain scattered manganese nodules about 1/4 to 1/2 inch in diameter. Fifteen feet south of the shaft a pit exposes manganese oxide in tuff, a sample of which returned 19 percent manganese. No other development work has been done. Picked pieces of float ran 41.1 percent manganese.

General Description: The gentle rolling hills are sparsely covered with sage brush. A small stream, Camp Creek, flows through the property. Snowfall is about one foot.

Remarks: Due to the limited amount of work done, no estimate of the amount of ore may be made. Additional work should be done to develop the property. If the manganese can be concentrated economically, the property may have merit.

Report by: Lancaster 6/19/41.

Crook County

(31)-(32)

HAMPTON BUTTE MANGANESE

Hampton Butte Area

Owners: C. M. Gulovson, Brothers, Oregon.Location: One claim on homestead in sec. 19, T. 20 S., R. 21 E. W. M. and one claim in sec. 21, same township and range.

Geology: Country rock is composed of Clarno (?) agglomerates, lavas and tuffs overlain by Harney(?) pumiceous rhyolite. Vesicular basalts in the agglomerate are cut by faulted, silicified dikes of jasperoid material, manganiferous in small blocks and patches. On the claim in sec. 21, the vertical "vein" strikes N. 45° W. for nearly 2000 feet, with another shorter "vein" 400 feet to the NE and parallel. Grade of ore is low, and it is highly siliceous. Samples taken gave the following results:

(31)	Sec. 19	BB406	23.7 percent Mn.	
(31)	"	"	1.	24.6 percent Mn.
(32)	Sec. 21	2.	21.4 percent Mn.	
(32)	"	"	3.	31.8 percent Mn.
(32)	"	"	4.	36.5 percent Mn.

Miscellaneous: Roads open May to December; water available only in small amounts; timber scanty; mostly juniper, a few firs. Transportation: 15 miles to Hampton on the Central Oregon Highway; thence 68 miles to the railroad at Burns, or 65 miles to Bend.

Report by: Allen 11/39.

Grant County

(35)

MACK CLAIMS

Murderers Creek Area

South Fork Area

Owner: F. C. Mack, Canyon City.Location: On Lost Cabin Creek, in sec. 20, T. 15 S., R. 28 E., 33 miles from John Day, half by highway, half by forest road.Development: No work done except two or three very shallow cuts. Manganese oxide, brownish in color, occurs in outcrops and shallow cuts.

Geology: Manganese oxide stain is of considerable extent. A qualitative test showed that the brown ore contained a high percentage of impurities; the darker ore below the brown ore was higher grade. Fractured and stained cherts are interbedded in serpentine, exposed at the north end of the deposit. The actual contact was not seen, but some serpentine in place appears to be impregnated with manganese. The south contact is probably with serpentine but is under heavy overburden. Reddish (and gray unstained) chert appears in an outcrop 1500 feet in length; the width is possibly about 250 feet. The manganese distributed over a greater width than this appears to be extremely low grade. Assays are as follows:

Sample No.	Gold Oz./ton	Manganese percent
1	0.08	0.7
2	Nil	2.1
3	Tr	0.9
4	0.01	Tr
5	Tr	1.1
6	Tr	0.8
7	0.02	3.2
8	Nil	1.2

The material is chalcedonic in character. One set of fractures has been filled with hydrated iron oxide accompanied by small amounts of manganite which cements the minute fractures. From evidence of the samples, the deposit seems to have been formed by the circulation of meteoric waters. There is no evidence as to the origin of the manganite (?) or the gangue material. This filling probably is of rather shallow depth, and it is questionable whether there is sufficient manganese present to warrant development.

Samples submitted to the State Laboratory at Baker by Rex Ellis gave the following results:

Submitted 3/10/38	Mn. 26.4
" 3/10/38	Mn. 29.6
" 12/31/37	Mn. 28.7 Insol. 31.2

Report by: Quine 11/27/37
Allen 1938
Wilkinson 1938

(36)

BEGGS MANGANESE

Canyon Area

Owner: Arthur Beggs, deeded land.

Location: 6 miles north of Mt. Vernon, just off highway #395, in sec. 6 (?),
T. 13 S., R. 31 E. W. M.

Development: One cut, now caved. Ore was seen on dump only.

Geology: Siliceous manganese ore occurs in thinly bedded chert striking N.
40 degrees W. and dipping 45 degrees N. E. The chert lens is bounded
on both sides by serpentine.

Report by: McKay, 1937.

Harney County

(37)

RED HILL MANGANESE

Silvies Area

Owners: Lee Bryan, William and Robert Drinkwater.Area: Property is on Drinkwater homestead entered in 1929. Three unpatented lode claims and 11 claims have been staked but not filed.Location: On the south edge of sec. 8 and the north edge of sec. 17, T. 20 S., R. 30 E.W.M.History: Discovered in 1938 by Lee Bryan, Phil Smith, and Alma Davis.Development: Open cuts only.Miscellaneous: Topography: rolling hills with mesa rim rock; vegetation: sage brush, scrub juniper with some pine timber half mile to the north-east of the property. Water is available in the Silvies River one mile to the west.Geology: Red iron-stained tuff interbedded with white tuff underlies rhyolite rim rock capping. The total thickness of the red tuff is perhaps 50 feet and the rhyolite rim rock is about the same. On the points of the Red Hill where the rim rock has been completely eroded, high-grade psilomelane (?) nodules have weathered out of the tuff to form surface concentrations. They are from pinhead size up to a maximum of 5 or 6 inches across the botryoidal and mamillary structures. The tuff itself may contain from 2 - 5 percent of these nodules, over an area five hundred feet square or more.

Seams of manganese oxide are found at the base of the overlying rhyolite cap and suggest that the origin of the manganese is from mineralizing solutions which penetrated the tuff from below, and, due to the relatively impervious cap-rock, deposited their load in it.

Report by: Allen 6/8/41.

(38)

SILVER BLOSSOM PROSPECT

Silvies Area

Owner: E. E. Lanfear, Burns, Oregon.Location: Center of the $N\frac{1}{2}$ of sec. 28, T. 19 S., R. 31 E.W.M. on the north side of Faun Creek, $\frac{1}{2}$ mile E. of Silvies River.Development: Location cuts, one large open cut, old tunnel caved 30 feet below cuts.Geology: A rimrock of porphyritic andesite (Harney series?) overlies green and yellow tuffs (Clarno?) cut by north-south trending rhyolite dikes.

Bench cappings of river gravels. Mineralization is secondary, consisting of concentration of manganese as siliceous botryoidal oxide deposits in openings in the rhyolite dikes. Exposures are very spotted, with only small patches visible.

Report by: Allen 10/11/39.

TABULATION
OF STATE ASSAY LABORATORY REPORTS.
ON MANGANESE SAMPLES

The following tabulation gives results of analyses of manganese samples submitted to the State Assay Laboratories. The localities in eastern and western Oregon from which samples were obtained are segregated according to counties and mining areas. The general regions eastern and western Oregon are separated by the summit of the Cascade Range.

Within each mining area the samples are listed geographically from the north and west towards the south and east. The first column of the table gives the locality number for reference to the maps and reports in this bulletin. The second column gives the laboratory number which could be used for reference to the original assay report on file at the State Assay Laboratories.

EASTERN OREGON

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
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BAKER COUNTYCracker Creek Area

---	249	3-11-40	38.8	Ed French, Baker, Oregon	T. 9 S., R. 37 E.	Psilomelane associated with limonite.
23	AB-755	- - -	33.4	Howard C. Van Arsdale Baker, Oregon	Sec. 9, T. 9 S. R. 38 E.	Rhodonite and braunite.
23	4	8-19-38	41.7	Do	Sec. 9, T. 9 S., R. 38 E.	Psilomelane and rhodonite.
22	4A	10-9-39	23.4	John Grant Baker, Oregon	Sec. 5, T. 9 S., R. 38 E.	Psilomelane and manganite.

Connor Creek Area

28	AB-575	5-14-40	22.5	Mrs. S. F. Taylor Taylor's Coffee Shop Ontario, Oregon	Sec. 5, T. 12 S., R. 45 E.	Manganese dioxide and quartz.
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Greenhorn Area

25	ABF-31	5-8-40	21.2	Pat O'Brien	T. 10 S., R. 36 E.	
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Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
Baker County (Cont'd.)						
<u>Lower Burnt River Area</u>						
29	Eagle 9	12-14-38	38.4	W. W. Frumbaugh Baker, Oregon	Sec. 15, T. 11 S., R. 44 E.	Manganese wad in lumps.
30	7	9-23-38	20.9	John Demos Baker, Oregon	Sec. 20, T. 10 S., R. 44 E.	Manganese wad
--	AB-437	4-24-40	31.6	Elma Smith Baker, Oregon	T. 10 S., R. 41 E. Pleasant Valley	-----
--	BBF-85	6-10-41	25.5	G. F. Lilley Baker, Oregon	At overhead crossing near Durkee	Siliceous man- ganese dioxide.
--	12	10-24-39	42.0	Walter Dorsett Durkee, Oregon	Unknown	-----
19	BB-319	- - -	38.3	Ed Hendryx Baker, Oregon	Sec. 33, T. 11 S., R. 42 E.	Manganese di- oxide and quartz.
17	BBF-55	4-17-41	26.1	A. L. Fugit Pleasant Valley	Sec. 12., T. 10 S., R. 41 E.	Very little man- ganese showing.
15	BBF-92	6-21-41	29.5	C. H. Kipp Baker, Oregon	Center Sec. 31, T. 10 S., R. 43 E.	-----
12	BBF-94	6-21-41	41.2	C. H. Kipp Baker, Oregon	Sec. 25, T. 10 S., R. 42 E.	-----
11	BBF-71	4-17-41	34.6	A. L. Fugit Pleasant Valley	Sec. 31, T. 10 S., R. 43 E.	Siliceous manganite.
10	BBF-70	4-17-41	41.5	A. L. Fugit Pleasant Valley	Sec. 25, T. 8 S., R. 42 E.	Siliceous-chiefly manganite.
4	BBF-54	4-17-41	21.2	A. L. Fugit Pleasant Valley	Sec. 12, T. 10 S., R. 41 E.	

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
Baker County (cont'd.)						
<u>Lower Burnt River Area (cont'd.)</u>						
3 ?	BEF-26	6-18-41	35.2	Prescott Lilley Baker, Oregon	Near Durkee	Manganese oxide.
3	BEF-72	4-17-41	44.3	A. L. Fugit Pleasant Valley	Sec. 12, T. 10 S., R. 41 E.	Manganite in lenticular chert.
2	AB-953	7-12-40	44.5	A. L. Fugit Pleasant Valley	Sec. 12, T. 10 S., R. 41 E.	Concentrate of manganese dioxide.
9	AB-326	- - -	33.4	R. S. Foster Baker, Oregon	Sec. 3, T. 10 S., R. 41 E.	- - - - -
9	AB-321	- - -	23.8	R. S. Foster Baker, Oregon	Sec. 3, T. 10 S., R. 41 E.	- - - - -
9	5	8-19-41	37.5	R. S. Foster Baker, Oregon	Sec. 3, T. 10 S., R. 41 E.	Wad.
9	6	10-8-38	41.5	R. S. Foster Baker, Oregon	Sec. 3, T. 10 S., R. 41 E.	- - - - -
<u>Sumpter Area</u>						
24	10	5-26-39	30.4	J. E. O'Neill Baker, Oregon	Sec. 35, T. 9 S., R. 37 E.	Lump psilomelane, iron oxide, and limonite.
<u>Upper Burnt River Area</u>						
26	Gertie #1-1	3-12-38	37.3	Will Hendrickson 2007 Spruce Street La Grande, Oregon	Sec. 2, T. 12 S., R. 39 E.	Siliceous honey- combed rock filled with manganese silicate; 1½' of footwall.

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
Baker County (cont'd.)						
<u>Upper Burnt River Area(Cont'd)</u>						
26	Gertie #2-2	3-12-38	30.7	Do	Do	Next $\frac{1}{2}$ ' into footwall from above sample.
27	11 -#2	6-10-39	20.4	John Dorn Baker, Oregon	Sec. 25, T. 13 S., R. 37 E.	- - - - -
27	BBF-88	6-10-41	41.1	Do	Near Unity, Ore.	Float
<u>Virtue Area</u>						
--	Blue Bird 18 #2	1-2-40	20.5	R. J. Holland Baker, Oregon	Sec. 20, T. 9 S. R. 42 E.	- - - - -
	3	8-12-38	20.3	Clou Nokes Baker, Oregon	Sec. 5, T. 10 S., R. 42 E.	Vesicular manganese.
--	Black Lode 8	10-14-38		A. F. Scharlbaum Pilot Rock, Oregon		Wad.
CROOK COUNTY						
33	BB-15	12-23-40	34.5	J. H. Israel Brothers, Oregon	Bear Creek Sec. 30, T. 18 S., R. 17 E.	Iron Stained manganese.
32	AB-1082	7-31-40	40.2	R. C. Reiter John Day, Oregon	T. 21 S, R. 21 E.	Manganese dioxide.
DESCHUTES COUNTY						
34	AB-1218	8-20-40	33.2	Clyde A. Telfer Horse Heaven Mines Inc.	Sec. 9., T. 15 S. R. 12 E.	

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
GRANT COUNTY						
	AB-847	6-24-40	31.0	Mrs. Erna Ross 525 Henry Bldg. Portland, Oregon	30 miles north of Burns	Limonitic quartz high in iron.
HARNEY COUNTY						
	AB-471	4-20-40	35.05	Wallace Bradshaw	T. 19 S., R. 30 E.	Bog iron ore limonite & man- ganese dioxide.
39	AB-565	5-8-40	35.7	Tom Seaweed Burns, Oregon	T. 34 S., R. 34 E.	Black
MALHEUR COUNTY						
41	AB-1355	9-23-40	47.0	Chas. J. Bush Harper, Oregon	About 4 miles N.W. of Westfall, Ore. on Buckbrush Creek.	
40	AB-520	4-30-40	20.4	L. P. Hull Home, Oregon	Sec. 22, T. 15 S., R. 45 E. Snake River	Altered oxidized rock.
UNION COUNTY						
24		7-22-39	55.1	James Oatson Baker, Oregon	East Eagle Area	Single lump pyrolusite.

WESTERN OREGON

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
<u>COOS COUNTY</u>						
<u>Beach Area</u>						
37	Z-379	4-20-39	36.8	Stanley L. Fitzgerald Coquille, Oregon	Sec. 18, T. 30 S., R. 14 W.	Slate-like rock containing a considerable amt. of manganite.
	BG-437	5-8-41	51.1	Hal Statsman Langlois	Sec. 18, T. 30 S., R. 14 W.	Mostly manganite & gray siliceous material with small amt. of pyrolusite.
37	Z-443	4-21-39	40.5	W. M. Briner Coquille	Sec. 18, T. 30 S., R. 14 W.	Manganite & pyrolusite.
<u>Coos Bay Area</u>						
	BG-438	5-8-41	10.9	Ray C. Treasher Grants Pass	Sec. 22, T. 29 S., R. 12 W.	Altered sedimentary rock containing a small amt. of manganese oxide.
37	Z-627	6-15-39	50.5	J. W. Eggers Takilma	Sec. 6, T. 30 S., R. 14 W.	No. 2. McAdams sample.
<u>CURRY COUNTY</u>						
<u>Chetco Area</u>						
46	BG-151 & 152	2-10-41	23.6 2.5	F. I. Bristol Grants Pass	Sec. 35, T. 39 S., R. 14 W.	No.1-High grade manganese oxide & altered rock. No.2-Low grade, dark gray schist-like rock containing small amt. manganese oxide.
46	BG-273	4-1-41	32.3	M. T. Edwards Portland, Oregon	Sec. 10, T. 40 S., R. 14 W.	Manganite, pyrolusite with some altered felsite.

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
(Curry County, Cheſco Area-Cont'd)						
47	Z-809	7-18-39	52.5	Nate Moore Harbour, Ore.	Sec. 23, T. 38 S., R. 12 W.	Manganite, psilomelane.
47	AG-1143	8-6-40	58.5	Nate Moore Harbour, Ore.	Sec. 13, T. 38 S., R. 12 W.	Three pieces of manganese oxide & altered rock.
	BG-466 & BG-467	5-24-41	53.4 56.4	Nate Moore Harbour	SE $\frac{1}{4}$ Sec. 14, T. 38 S. R. 12 W.	Samples from "Long Ridge Manganese" deposit; across outcrop #1 represents pyrolusite & some wad from 5' of loose material including some dirt. #2 the same except from more solid manganese. Samples should be representative of about 40 tons of material.
47	AG-444	3-27-40	53.0	William L. Feker Grave Creek	Sec. 22, T. 40 S., R. 12 W.	Manganite & pyrolusite.
50B	BG-57	1-24-41	54.3	B. A. Draper Grants Pass, Ore.	Sec. 13, T. 41 S., R. 11 W.	Manganese oxides with a small amt. of iron oxide and quartz.
50A	Y-154	1-17-38	34.2	John Taggart O'Brien	Sec. 11, T. 41 S., R. 11 W.	Slate-like rock containing a considerable amt. of pyrolusite.
	BG-64 & 77	1-27-41	42.7	J. M. Frazier Coquille	Sec. 26, T. 39 S., R. 10 W.	No.1-Rusty quartz; No.2-Gray rhodochrosite with a small amt. of manganese oxide.

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
CURRY COUNTY-(Cont'd)						
<u>Gold Beach Area</u>						
46	Z-235 & 236	3-29-39	0.8 32.4	W. M. Briner Coquille	Sec. 3, T. 39, R. 14. W.	No. 1 Altered basic rock containing a very small amt. of manganese oxide. No. 2 Quartz, manganite and lime.
<u>Sixes River Area</u>						
	Z-310	4-4-39	29.2	W. M. Briner Coquille	NE ¹ / ₄ Sec. 31, T. 31, R. 14 W.	Hutton sample. Fine altered rock containing a considerable amt. of manganite & pyrolusite.
JACKSON COUNTY						
<u>Gold Hill Area</u>						
	AG-356	3-18-40	16.5	H. W. Ward Medford	Sec. 25, T. 36 S. R. 4 W.	Rusty quartz and altered rock containing a large amount of manganese oxide and iron oxide.
20	AG-1471	11-30-41	11.7	John H. Helman Medford	Sec. 1, T. 37 S., R. 3 W.	No. 2-Bailey-Mostly iron oxide and siliceous material with a small amount of manganese oxide.
12	AG-1472	11-30-40	40.1	John H. Helman Medford	SE ¹ / ₄ Sec. 17, T. 34 S., R. 2 W.	Mostly manganese oxides with some siliceous material.
16	AG-1527	12-5-40	20.4	George C. Irwin Rogue River	Sec. 25, T. 35 S. R. 4 W.	Mostly manganese oxide with some gray, siliceous material and a small amt. of rhodonite.

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
<u>JACKSON COUNTY</u>						
<u>Gold Hill Area-Cont'd.</u>						
13	BG-63	1-28-41	41.7	John H. Helman Medford	SW ¹ / ₄ Sec. 17, T. 34 S., R. 2 W.	Finely ground material containing manganese oxide.
<u>Lake Creek Area</u>						
	AG-355	2-24-40	20.4	Glen C. Hunter P.O. 62, Grants Pass	Sec. 9, T. 37 S. R. 2 E.	Gray siliceous material with noticeable amount of manganese dioxide.
<u>JOSEPHINE COUNTY</u>						
<u>Illinois River Area</u>						
29	AG-1432	11-7-40	33.9	A. L. Edgerton Grants Pass	Sec. 8, T. 38 S., R. 8 W.	Two pieces of slate-like rock containing a small amt. of manganese dioxide.
28	AG-1473	12-2-40	47.5	John E. Hamlin Wonder	Sec. 11, T. 36 S., R. 8 W.	Slate-like rock contain- ing a large amt. of man- ganese oxide.
<u>Waldo Area</u>						
	AG-357	3-13-40	42.2	D. A. Wright Jacksonville	T. 41 S., R. 5 W.	Manganite & rhodonite.
30	AG-1176	Aug. '40	54.1	Albert E. Sangston Takilma	Sec. 26, T. 39 S., R. 7 W.	One piece of manganese oxide.
	AG-1178	8-21-40	62.2	C. H. Davis Medford	Sec. 3, T. 41. S. R. 5 W.	Manganese oxide.

Locality No.	Sample No.	Date Submitted	Assay % Mn.	Sender or Owner	Location	Description of Sample
LANE COUNTY						
	BG-204	2-28-41	22.4	J. E. Bartlett Grants Pass	On south side Rubble Rock Mt. North Fork Mc- Kenzie River, 16 miles up.	One piece of material consisting mostly of psilomelane with smaller amts. of pyrolusite & manganite. The sample also contained quartz & iron oxide. (Assay 34.8% Iron)
MARION COUNTY						
55	BB-357	3-1-41	35.3	Albert Jaeger 1730 N. Capitol St. Salem, Oregon	Sec. 13, T. 9 S., R. 1 E.	Manganese oxide and car- bonate.
POLK COUNTY						
	BG-266	3-7-41	26.4	E. G. Kingwell Salem	NW ¹ / ₄ Sec. 36, . T. 7 S., R. 6 W.	Impregnated tuff.

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