

Lake Creek District
Jackson County, Oregon

Name: Oregon Manganese Mine. (Tyrrell) APR 7 1939

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

Location: The property is located approximately thirty miles in an easterly, slightly south, direction from the City of Medford, Jackson County, Oregon where large mercantile establishments are located which carry stocks of mining supplies, etc. and where camp and food supplies may be had at a reasonable cost.

Property: The Oregon Manganese Mine property consists of five (5) mining claims, namely, Manganese Claims Nos. 1 to 5 inclusive, and two tunnel sites (unpatented) known as the Manganese and the West Manganese Tunnel Sites. Also, that deeded land more particularly described as the S. $\frac{1}{2}$ of the N.E. $\frac{1}{4}$ of Sec. 9 and a parcel of land 31 rods in width and 80 rods in length off of the south side of the N.E. $\frac{1}{4}$ of said Sec. 9, and the W. $\frac{1}{2}$ of the N.W. $\frac{1}{4}$ of Sec. 10, and the S.W. $\frac{1}{4}$ of the S.W. $\frac{1}{4}$ of Sec. 3, all of which claims and deeded land are located in Township 37 South of R. 2 E. of Willamette Meridian, Jackson County, Oregon.

Water: The water supply for this mine would be derived from Lost Creek and possibly the South Fork of Little Butte Creek. It is believed a favorable mill site may be found where the water supply could be brought in by gravity. If not, same will have to be pumped to the mill installation. During eight months of the year Lost Creek apparently carried several second feet of water, but it is low during the summer season. Little Butte Creek, however, carries a large volume of water and may be depended upon for both mill and camp use during any part of the year.

Geology: The Oregon Manganese Mine, formerly known as the Tyrrell Mine, was placed in operation during the World War and a Government Bulletin, No. 725, pages 211 to 220, refers to the operation of the Tyrrell Mine and the surrounding Lake Creek (Manganese) District. The following excerpts are from this Bulletin:

"Deposits of oxide minerals in open spaces.--

"The deposit at the Tyrrell mine and other deposits in the Lake Creek District consist of manganese oxides that fill cracks, pores, or other cavities in a Tertiary volcanic tuff. The manganese minerals are distributed over several hundred acres, but so far as known they do not extend more than a few feet below the surface. As a rule the mineralized tuff does not carry more than 1 or 2 per cent of manganese, but in a few places portions that contain from 10 to 20 per cent or more constitute bodies of considerable size.

"Manganite is the principal ore mineral. Psilomelane

and wad are moderately abundant, and there are small amounts of a soft brown greasy-lustered oxide that appears to be derived from the manganite by alteration in place. A superficial part of the ore-bearing layer generally contains most of the softer oxides and is relatively poor in manganese. Below this is a richer layer containing the harder oxides. Most of the ore is segregated in distinct streaks, grains and nodules and is therefore easily separated by ordinary milling methods from the rather soft tuff. The rocks of the Lake Creek district belong to the Tertiary volcanic series that composes the middle and southern parts of the Cascade mountains".

"Manganiferous Deposits"

"Distribution and General Features"

"Manganese in greater amounts than are ordinarily found in igneous rocks is practically confined to the red tuff and the gray tuff associated with it, described as bed 4 in the table on page 215. Outcrops of the red tuff that are scattered throughout the district and aggregate several hundred acres show noticeable amounts of manganese oxides generally. In most places the material exposed at the surface is estimated to carry from 0.5 to 2 or 3 per cent of Manganese. Locally, at least, there is a lower layer that is much richer. At the Tyrrell mine this layer is as much as 12 feet thick and carries from 10 to 20 per cent of manganese. The total thickness of manganiferous material ranges from a foot or two on the Vestal claims to 30 feet or more on the Tyrrell mine.

"The manganese occurs as oxides that are deposited in cracks and cavities forming irregular streaks, veinlets, nodules, and grains. To a slight extent these bodies have made additional room for themselves by replacing the tuff. In the upper layer as a rule most of the oxides are soft and sooty, and in the lower layer they are rather hard and compact. Owing to the comparative softness of the tuff it is very easily separated from the harder oxides by ordinary means. Tests made by both the Manganese Metals Co. and Victor Rakowsky with jigs and tables show that the production of a concentrate running as high as 55 per cent of the manganese is practicable, and that under the conditions prevailing in the summer of 1918 crude material containing as little as 10 per cent of manganese could probably be worked at a profit."

Development:

The development of this property consists of open cuts, pits and tunnels. The portal of the largest or main tunnel located up the hill about 300 feet easterly from the old mill and is caved at the present time. To the south of the so-called main tunnel we find a large open pit, probably 100 feet in length. There is an open pit twenty feet wide about 400 to 500 feet south of this deposit.

The above excerpts were taken from a report by Mr. William F. Hayden. March 18, 1938.

TYRRELL MANGANESE DEPOSIT

Location: This occurrence is in the Lake Creek District in the N $\frac{1}{2}$ of the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$, sec. 10, T. 37 S., R. 2 E., about 15 miles in a straight line northeast of Medford, Jackson County. It is reached by road as follows: by the Crater Lake Highway from Medford to Eagle Point 11 miles, by the Lake Creek road from Eagle Point to Lake Creek Post Office 12 miles, and from the Lake Creek Post Office to the Bush Ranch on Lost Creek, a distance of about 5 miles, the first four miles of which are by county road. The last mile is impassible for automobiles during wet weather. The old mine workings are on the east side of Lost Creek about 1500 feet southeast of the ranch house and about 300 feet higher at an elevation of about 2300 feet. Most of the area covered by the Tyrrell deposit is now owned by B. M. Bush.

History: The deposit was opened and worked during 1917 and 1918 by the Manganese Metals Co. Some drilling was done to determine the extent of the ore, and a concentrating mill with a capacity of about 20 tons of crude ore in 24 hours was built. Operating intermittently, the mill produced about 200 tons, of concentrates said to assay about 46.5% to 52.8% manganese, 11.1% to 14.5% iron, 0.09% to 0.207% phosphorus, and 0.08 to 0.16 oz. gold to the ton. When the war ended production stopped. The crude ore treated at the mill was reported to have averaged about 20% manganese.

Topography: The immediate region is hilly to low mountainous with slopes rising several hundred feet to generally rounded or nearly flat summits. The vegetation consists commonly of scrub oaks with less frequent pine, fir and madrone trees and occasional large patches of

manzanita. The Tyrrell deposit is at or near the lower part of the flat ridge of the hill which rises 400 to 500 feet above and east of Lost Creek, with the summit rising much higher to the south. The drainage is to Lost Creek and the South Fork of Little Butte Creek, the latter running northwest to join Little Butte Creek and the Rogue River.

Geology: According to Pardee (U.S.G.S. Bulletin 725-C) the rocks of this district belong to the Tertiary volcanic series composing the middle and southern parts of the Cascade Mountains, and consist mostly of nearly horizontal flows of basalts, tuffs and breccias. The Tyrrell deposit is in a red tuff underlain and, where not eroded away, overlain by basalt flows. The thickness of the capping varies from nothing at the north end to 20 feet or more on the south. This red tuff is widespread throughout the Lake Creek region and in places is stained and impregnated with oxides of manganese. The impregnations vary from thin staining to irregular seams and veinlets up to a half inch thick.

The manganese minerals, consisting of manganite, psilomelane and pyrolusite were probably deposited from meteoric waters which had taken the manganese into solution from overlying lavas. Some of the upper portions of the tuff show cavities evidently once containing manganese minerals which were dissolved and carried away, perhaps being reprecipitated below in the lower layers of the tuff.

Tyrrell
Mine

As shown by the accompanying property map, the old workings are about 150 feet south of the south boundary of the Bush ranch and on government land covered by the location. It is doubtful, however, if there is much available ore left here. The main body is covered by the Bush ground and extends east into the Harding ground.

The mine was opened in a north and south opencut about 150 feet long, about 30 feet wide at the top and about 30 feet deep on the high side. The upper contact of the tuff and basalt is irregular. On the south end a thickness of 20 feet or more of tuff without capping is exposed. It is cut off here by a steeply dipping diabase (or coarsely crystalline basalt) dike, striking east, 15 or 20 feet wide. Farther north in the opencut the tuff is capped by basalt and it is possible to see only the upper few feet of tuff because of caving from the sides of the opencut. At the south end two tunnels, close together, were driven; one is about 8 feet long with the face against the dike, the other, about 50 feet long, driven to the east, is partly in basalt, indicating that this level is close to the bottom of the tuff. A little of the better grade of manganiferous tuff is exposed near the diabase dike, but very little is now left in other parts of the opencut.

At the north end, below the basalt, an opencut has been driven east into the red tuff about 20 feet below the contact. It is probable that this cut was continued by tunnelling into the tuff, but caving has covered up all evidence except the ends of timber, probably lagging. The tuff as exposed in this cut is a soft, red, kaolinized material, containing only small amounts of manganese oxides. Faulting here is indicated by slickensides on the face of the basalt over the soft tuff and by fault breccia in the tuff on the south side of the cut. Above this soft tuff, the basalt is brecciated and contains fair amounts of manganese oxides. However, the quantity available here is probably small.

To the north of the opencut, a grade for a mine car track was made, following the exposure of the red tuff, for a distance of about

850 feet to the north end of the hill. At and near this north end, better grade material is exposed, and it is evident that the operators considered this area as favorable for exploitation, and that the ore available in the large opencut was considered to be exhausted.

At a point about 200 feet south of the north end of this track grade, an opencut was run into the tuff and a tunnel about 15 feet in length was driven. The rock in the tunnel appears to be low grade, but some portions above the portal are of better grade material. The exposure here is about 20 feet thick. Samples were taken at the exposures of the tuff as indicated by the accompanying sketches.

On the broad, flat summit of the hill, just above the outcrops as described above, several drill holes were put down through the tuff by the operators in 1918. Records of these holes are not now available. Pardee states that "the other workings, including 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 manganese material". The drilling was reported to have covered 3 or 4 acres.

**Economic
Factors:**

Pardee states that "It is reasonably certain that the Tyrrell Mine contains a large body of material that carries from 2 or 3 to 15 percent manganese, the richer parts of which are probably workable under conditions approximating those of 1918".

Assuming an area of 4 acres underlain by an average of 15 feet

of minable ore, there would be a reserve of something over 200,000 tons. It is entirely possible that a greater area than 4 acres could be proved. Judging by the surface exposures, and without a knowledge of the drill hole results, there would be a certain proportion of the whole which would be too low grade to mine even under emergency conditions. The tuff outcrops over some of the northern part of the area with little overburden, and probably could be mined by surface methods. The thickness of capping and the distribution of the minable grade would determine whether surface or underground mining would be necessary for the major part of the deposit.

Except for transportation facilities, operating conditions are favorable. The climate is generally mild. Water is available, although storage in Lost Creek or some other source of supply might be necessary during the dry season. The nearest rail shipping point is Eagle Point, at a distance of about 17 miles by road.

A concentrating or lixiviation plant would be necessary, but it is probable that a good recovery of mineral could be made by combining mechanical and flotation methods; and that, in the case of lixiviation, percolation would be satisfactory with relatively coarse crushing. Should fine grinding be necessary, the texture of the metallized portions of the tuff should allow this with a minimum of wear on the grinding parts.

Any producing operation in this area should be preceded by extensive drilling to determine the extent, grade and distribution of the manganese minerals. Should a sufficient tonnage of minable grade be proved, it would be essential to work out an economic metallurgical process for recovering the manganese in a concentrated form before mining operations were attempted. In this process it would be determined whether or not the gold could be saved economically.

STATE DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

STATE ASSAY LABORATORY—GRANTS PASS
OREGON

ASSAY REPORT

December 22, 1937

Mr. Earl K. Nixon, Director,
State Department of Geology and
Mineral Industries
704 Lewis Building,
Portland, Oregon.

Following are the results of assays made on samples
submitted to the assay laboratory by Mr. Libbey:

Office number	Sample number	Manganese percent	Gold		Silver		Webber	
			Oz./ton	\$/ton	Oz./ton	\$/ton	Mn	Fe
555	1	2.47					2.55	7.6
556	2	0.47					0.55	5.1
557	3	2.41					2.44	7.8
558	4	8.20					7.83	6.8
559	5	1.96					Results of check Assays of Libbey Samples by W.A. Markert, Iron River, Mich. placed here for comparison	
560	6	0.48						
561	7	4.96						
562	8	6.70						
512	9	0.25	trace			blank		
513	10	2.87	0.02	0.70		blank		
514	11	17.31	0.01	0.35		blank		

(signed) Albert A. Lewis

Assayer

TYRRELL MINE (manganese)

Lake Creek Area

(see also Manganese Metals Co.; Oregon Manganese Co.)

*See 220
Bull. Ranch
data*

This property has had more work done on it and shows more promise than any other deposit in southwestern Oregon. Ore was mined and concentrated here during the first World War. There are 150 feet of underground workings, a large open cut, and drill holes over an area in sec. 3. The mill would handle 20 tons per 24 hour shift.

Crude ore is reported to have assayed from 14-20 percent manganese for high grade and down to 2 percent for low grade. Manganese concentrate assayed from 46.5 - 52.8 percent Manganese.

The ore consists of manganese oxides filling cracks and cavities, and in part replacing the tuff. The ore zone is poorly defined and the tenor varies so markedly that drilling is the only safe method of computing reserves.

Some engineers consider the ore as concentrated near, and originating from, a nearby diabase dike. Others are inclined to agree with Wells (39) that "solutions permeating the volcanic series leached manganese and silica and transferred them to openings mainly in the breccia member". Occurrences of manganese at other localities tends to support this view.

If Wells (39) deductions are correct, a drilling program might outline a body of ore that could be worked profitably. But by the same token it is difficult if not impossible to predict ore reserves from development work done to date.

See Tyrrell Report in file.

QUARTZ PROPERTY

1. Name of property _____
Operating company (or individual)
Address
Location of property
Acreage of holdings
2. History of property, past and recent:
3. History of production:
4. Development: Number of levels, lengths of drifts and cross-cuts, raises, etc.:
5. General description and equipment on hand, topography, country rocks, elevation, timber, water, snow fall, climate, power, etc.
6. Geology - General and local. Ore geology - type of deposit, i.e., vein, mineralized zone, bed; contact relations, attitude and orientation, vein minerals, gangue, type of mineralization, alteration, enrichment, etc.
7. Metallurgy - nature of ore, hard or soft, free-milling, base, direct shipping, etc. Kind of mill and equipment in use or planned, current daily tonnage of ore or concentrates, approximate value, freight rates to smelter, etc.
8. Remarks - economics: High or low cost, principal drawbacks, reasons for success or failure, apparent life of operation based on apparent quantity of ore available.

Report made by Orash

TYRELL MANGANESE INVESTIGATION

Purpose

A hurried reconnaissance trip to the Tyrell manganese locality was made on October 17th to secure information and impressions. Heavy rain, muddy roads, and poor directions handicapped the time available, and the following is presented as a brief summary.

Location

Claims are located in the W. $\frac{1}{2}$ of S.W. $\frac{1}{2}$ of Sec. 10, T. 37 S., R. 2 E., in Jackson County, on the Lost Creek tributary to Little Butte Creek. The area is reached from Medford, out the Crater Lake Hwy, 11 miles to Eagle Point; from Eagle point on gravelled road to Brownsboro and Lake Creek a distance of 11 miles; at Lake Creek cross bridge, take right hand road to Dead Indian Cr. a distance of 4 miles just beyond present crossing to N.E. side of Little Butte Creek to old covered bridge which used to be the crossing; turn right (S.W.) thru gate, up Lost Creek, a distance of 0.5 miles to B. M. Bush ranch house. Thence on foot up road-way behind house to the mine workings which are S.E. of ranch house. Road paved to Eagle Point, gravelled, good to Lake Creek, gravelled but slippery to private road; private road impassible in wet weather. * Quarry and tunnels are above ruined mill. Inquire of B. M. Bush for further details.

History

Mr. B. M. Bush has purchased the J. H. Tyrell property as shown on property map. The original 7 claims were staked along the supper slopes of the east side of Lost Creek. Only 3 were on U. S. land, the remainder on dedeed land with no provision for mineral rights. Bush states that manganese outcrops on the east side of Lost Creek, running north-south over a distance of 4-5 miles. He disclaims any knowledge of a $\frac{1}{2}$ mile vein or any

vein. An area in Sec. 3 was drilled at one time and 1200 tons of ore blocked out. Man named Scott has the records; Bush can locate his full name and address if desired. This land now owned by Bush.

Bush is familiar with area and states that manganese outcrops over entire hillside at about the same elevation as the Tyrell workings, probably becoming better toward the south, or the head of the creek. He stated that the ore is pockety, occurring as "boulders" in breccia. No persistent vein.

The Bush family has been using manganese concentrate for fertilizer. He states that it adds color to foliage and acts as a fertilizer; that he can tell areas in his fields where manganese occurs by the more lush vegetation. He would like to sell to some reliable outfit, who, if they purchase, are financially able to handle the situation. A Mr. Hayden of Grants Pass has been up to his place several times.

Workings

A mill about 20' x 40' is now practically ruined, all machinery removed. Building is a total wreck and unsafe. Ore was obtained from an open pit and tunnel about 50' above. Another tunnel (reported) several hundred feet in length occurs above these workings; now caved in; would take \$1000 to open it; not visited.

Workings consisted of an open pit with a 30' face. Lower two-thirds is composed of a brick-red agglomerate or tuff, cut by small stringers of manganese in its lower portion. Upper portion is basalt, fairly fresh, unconformable on the tuff. Basalt is manganese stained and may represent some ore. An upper pit, to the south, is not so deep, extending slightly below the unconformity, and at the south end are two tunnels, one 10' long, the other unexplored. Samples of high-grade and some of the "red-rock" were collected. To the north, a short tram extended, at this upper level. (see photos).

Apparently the manganese-bearing solutions penetrated the rock of the tuff series, depositing the manganese in joint-planes and cracks. At certain places,

ore was concentrated, perhaps by some concretionary process, to form "boulders" of high-grade. Method of occurrence would suggest circulating waters as means of concentration; it may be that the deposition of Manganese bears some relationship to the deposition of cinnabar and formation of altered-rock-clay areas by hydrothermal solutions; i.e., after the solutions had lost their heat, and circulated nearer the surface, manganese was taken into solution and deposited in the joint planes and cracks.

The red tuff bed is exposed over a horizontal distance of not over 100' before the overburden of basalt would necessitate underground mining. The ore is supposed to be in the tuff, of low grade. Open pit mining would be practical over a small area only. No evidence of quantity of ore was obtained during brief examination, or probable downward-extension of deposit; but in my opinion the "ore-bed" would not have any particular depth. It might underlie the basalt, but probably not for any distance as the deposit appears to be formed by circulating waters near the surface.

Previous reports.

This area has been reported by J. T. Pardee, in Bulletin 725-C of the U. S. Geological Survey, in which not only the Tyrell, but the Newstrom to the north, and many others in the area north and east of Medford are treated. A copy of Mr. Pardee's report on the Tyrell property is reproduced herewith and from my hurried examination appears to give a fair picture of the situation. Blue prints in the files of the old Oregon Bureau of Mines and Geology are attached.

Conclusions

No extended body of high-grade ore is available in this district. It may be that there is a considerable body of low-grade ore in the tuff; the quantity and quality would necessarily be outlined by drilling. This occurrence, and others nearby suggested the possibility of mining and handling the ore in a manner similar to that of the Rustless Iron & Steel Company in their chrome

operations in southern Oregon; i.e., from a number of isolated localities to collect ore, which in the aggregate would represent a sizeable deposit. The Lake Creek District, as described by Pardee, the area north of Medford in the Evans Cr. area, and occurrences on the southern Oregon coast in Coos and Curry counties should be prospected.

Ray C. Treasher
Geologist.

DEPOSITS OF MANGANESE ORE IN MONTANA, UTAH, OREGON, AND WASHINGTON

By J. T. Pardee

UNITED STATES GEOLOGICAL SURVEY

Bulletin 725-C

Tyrrell

The Tyrrell mine is on the east side of Lost Creek about 15 miles in a straight line east northeast of Medford. The nearest post office is Lake Creek, 5 miles to the northwest, and the nearest shipping place is Eagle Point, on the Pacific & Eastern Railway, 12 miles farther away. The mine is conveniently reached from Medford by automobile over a road 30 miles long that passes through Eagle Point and Lake Creek. Development of the deposit by open cuts and drilling was begun in the fall of 1917 by the Manganese Metals Co., which later built a concentrating mill capable of treating about 20 tons of crude ore in 24 hours. Prior to July 15, 1918, the mill was operated intermittently and produced about 200 tons of concentrate. 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., on which he had obtained an option.

The mine is about a mile above the junction of Lost Creek and South Fork of Little Butte Creek, on a northward-descending spur that separates the two streams. The altitude of Lost Creek is about 2,000 feet, and the summit above the mine rises from 400 to 600 feet higher.

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 rocks mentioned are cut by a steeply pitching dia-

bese dike 10 feet wide that strikes east.

The main working is an open cut 100 feet long and from 20 to 30 feet deep on the uphill side. It is made on the steep west slope of the spur east of Lost Creek, at a level about 300 feet above the stream. At the intervals for 1,000 feet or more northward to the turn or most of the spur smaller cuts are made on the same level; On the summit, at the same or a slightly higher level, an area of 3 or 4 acres has been prospected by drilling. At a level about 40 feet lower an adit is run part way beneath the main cut.

The ore is found in the upper part of the red tuff as irregular veinlets and nodules. (See Pl. X, B.) 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 1,000 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 mangiferous 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. 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 mangan-

iferous 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.

The crude ore treated at the mill is reported to have averaged about 20 per cent 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 obtained by Mr. Parks, representing the lower 12 feet of the layer at one place in the main cut, contained 14.86 per cent of manganese. Other samples mostly representing the upper part of the layer as exposed in the smaller cuts contained less, the minimum reported by Mr. Parks being 2.13 per cent. Samples of two car lots of concentrate reported by the Manganese Metals Co., carried 47.5 and 48.5 per cent of manganese, other samples of concentrate contained from 46.5 to 52.3 per cent of manganese, 11.1 to 14.5 per cent of silica, 1.4 to 0 per cent of iron, 0.09 to 0.207 per cent of phosphorus, and 0.08 to 0.16 ounce of gold to the ton. According to Mr. Rakowsky, the concentrate from a sample treated at Joplin, Mo., showed still more manganese and less silica than the samples mentioned above.

It is reasonably certain that the Tyrrell mine contains a large body of material that carries from 2 or 3 to 15 per cent of manganese, the richer parts of which are probably workable under conditions approximating those of 1918. 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.

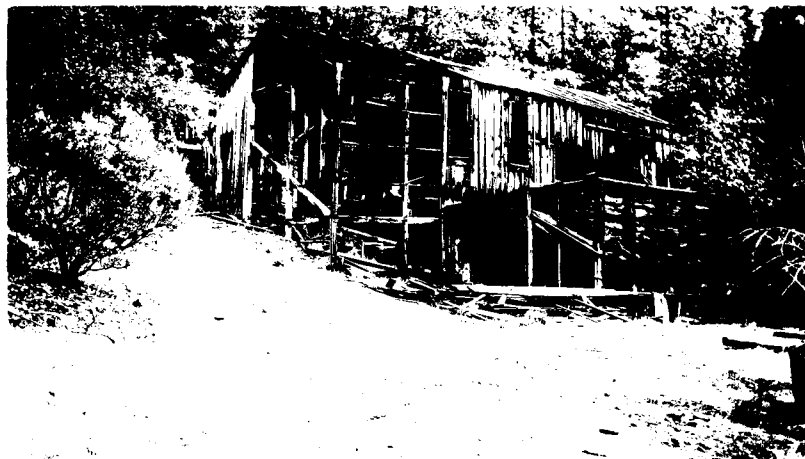


Fig. 1. Tyrell Manganese Claims: Ruins of Mill



Fig. 2

Tyrell Manganese Claims
Main open cut, 30' high

SOME
MANGANESE DEPOSITS
of
SOUTHWESTERN OREGON.

A short, preliminary study of occurrences of Manganese in Southwestern Oregon was initiated by the State Department of Geology and Mineral Industries because of its industrial importance and because of the interest evidenced by many inquiries to the Department from outside the State. Only a few of the typical known occurrences could be visited in the time allotted. Further studies should be made in order to obtain more complete knowledge of the mineral resources of the State.

Manganese minerals occur rather widely in Southwestern Oregon, especially as accessory minerals in or near gold deposits in Josephine and Jackson counties. To determine whether or not manganese occurs in sufficient concentrations to make an economic deposit requires extensive underground exploration, typically in the form of drilling; and they may not be evaluated from a few surface exposures. In the case of evident small tonnages, or because of chemical combinations which would make beneficiation difficult or industrially impossible, certain deposits can, of course, be at once classed as not worthy of development as manganese deposits. Other occurrences may have a meagre development, but because of probable origin and mineral associations, they give evidence warranting further exploration.

In a general way, the occurrences visited may be divided into two classes characterized mainly by origin. One is made up of those deposits formed by a deposition from circulating surface waters, with the manganese taken into solution from basaltic lavas and precipitated

as oxide because of a change in the physical or chemical character of the rock which the solution later penetrated. The second is composed of those in which the essential mineral was rhodonite, derived from a magma and deposited hydrothermally, usually with accessory minerals. The rhodonite has been oxidized superficially to manganese oxides.

In rhodonite the manganese is in chemical combination with the silica and may not be separated by mechanical means; and, since present metallurgical practice requires a manganese low in silica, rhodonite deposits are thus usually ruled out as a source of metallurgical manganese. Should a very large deposit containing rhodonite be found however in which reserves could be estimated in many millions of tons, with the percentage of manganese in an economic amount, it is entirely probable that a treatment process could be worked out so as to separate the manganese and silica and to produce the manganese in a marketable form. A large tonnage would be necessary to provide the incentive for extensive metallurgical testing.

The first class of occurrences is represented by the area described as the Lake Creek district and surrounding region. The mineral occurs as an original oxide disseminated usually through a nearly horizontal tuff. Beneficiation to obtain a marketable manganese product would be feasible and the chief problem is whether or not the manganese occurs in concentrations sufficient to make them economic. Only exploration can determine this, but, in view of the widespread occurrence of the manganese impregnated tuff, a few preliminary test drill holes, at least, seem warranted.

Descriptions of the deposits visited follow.

TYRRELL MANGANESE DEPOSIT.

LOCATION: This occurrence is in the Lake Creek District in the N $\frac{1}{2}$ of the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$, sec. 10, T. 37 S., R. 2 E., about 15 miles in a straight line northeast of Medford, Jackson County. It is reached by road as follows: by the Crater Lake Highway from Medford to Eagle Point 11 miles, by the Lake Creek road from Eagle Point to Lake Creek Post Office 12 miles, and from the Lake Creek Postoffice to the Bush Ranch on Lost Creek, a distance of about five miles, the first four miles of which are by county road. The last mile is impassible for automobiles during wet weather. The old mine workings are on the east side of Lost Creek about 1500 feet southeast of the ranch house and about 300 feet higher at an elevation of about 2300 feet. Most of the area covered by the Tyrrell deposit is now owned by B. M. Bush.

HISTORY: The deposit was opened and worked during 1917 and 1918 by the Manganese Metals Co. Some drilling was done to determine the extent of the ore, and a concentrating mill with a capacity of about 20 tons of crude ore in 24 hours was built. Operating intermittently, the mill produced about 200 tons of concentrates said to assay about 46.5% to 52.8% manganese, 11.1% to 14.5% iron, 0.09% to 0.207% phosphorus, and 0.08 to 0.16 oz. gold to the ton. When the war ended production stopped. The crude ore treated at the mill was reported to have averaged about 20% manganese.

TOPOGRAPHY: The immediate region is hilly to low mountainous with slopes rising several hundred feet to generally rounded or nearly flat summits. The vegetation consists commonly of scrub oaks with less frequent pine, fir and madrone trees and occasional large patches of manzanita. The Tyrrell deposit is at or near the lower part of the flat ridge of the hill which rises 400 to 500 feet above and east of Lost Creek, with the summit rising much higher to the south. The drainage is to Lost Creek and the South Fork of Little Butte Creek, the latter running northwest to join Little Butte Creek and the Rogue River.

GEOLOGY: According to Pardee (U.S.G.S. Bulletin 725-C) the rocks of this district belong to the Tertiary volcanic series composing the middle and southern parts of the Cascade Mountains, and consist mostly of nearly horizontal flows of basalts, tuffs and breccias. The Tyrrell deposit is in a red tuff underlain and, where not eroded away, overlain by basalt flows. The thickness of the capping varies from nothing at the north end to 20 feet or more on the south. This red tuff is wide spread throughout the Lake Creek region and in places is stained and impregnated with oxides of manganese. The impregnations vary from thin staining to irregular seams and veinlets up to a half inch thick.

The manganese minerals, consisting of manganite, psilomelane and pyrolusite, were probably deposited from meteoric waters

which had taken the manganese into solution from overlying lavas. Some of the upper portions of the tuff show cavities evidently once containing manganese minerals which were dissolved and carried away, perhaps being precipitated below in the lower layers of the tuff.

TYRELL MINE: As shown by the accompanying property map, the old workings are about 150 feet south of the south boundary of the Bush ranch and on government land covered by location. It is doubtful, however, if there is much available ore left here. The main body is covered by the Bush ground and extends east into the Harding ground.

The mine was opened in a north and south opencut about 150 feet long, about 30 feet wide at the top and about 30 feet deep on the high side. The upper contact of the tuff and basalt is irregular. On the south end a thickness of 20 feet or more of tuff without capping is exposed. It is cut off here by a steeply dipping diabase (or coarsely crystalline basalt) dike, striking east, 15 or 20 feet wide. Farther north in the opencut the tuff is capped by basalt and it is possible to see only the upper few feet of tuff because of caving from the sides of the opencut. At the south end two tunnels, close together, were driven; one is about 8 feet long with the face against the dike, the other, about 50 feet long, driven to the east, is partly in basalt, indicating that this level is close to the bottom of the tuff. A little of the better grade of manganiferous tuff is exposed near the diabase dike, but very little is now left in other parts of the open cut.

At the north end, below the basalt, an opencut has been driven into the red tuff about 20 inches below the contact. It is probable that this cut was continued by tunnelling into the tuff, but caving has covered up all evidence except the ends of timber, probably lagging. The tuff as exposed in this cut is a soft, red, kaolinized material, containing only small amounts of manganese oxides. Faulting here is indicated by slickensides on the face of the basalt over the soft tuff and by fault breccia in the tuff on the south side of the cut. Above this soft tuff, the basalt is brecciated and contains fair amounts of manganese oxides. However the quantity available here is probably small.

To the north of the opencut, a grade for a mine car track was made, following the exposure of the red tuff, for a distance of about 850 feet to the north end of the hill. At and near this north end, better grade material is exposed, and it is evident that the operators considered this area as favorable for exploitation, and that the ore available in the large opencut was considered to be exhausted.

At a point about 200 feet south of the north end of this track grade, an opencut was run into the tuff and a tunnel about 15 feet in length was driven. The rock in the tunnel appears to be low grade, but some portions above the portal are of better grade material. The exposure here is about

20 feet thick. Samples were taken at the exposures of the tuff as indicated by the accompanying sketches.

On the broad, flat summit of the hill, just above the outcrops as described above, several drill holes were put down through the tuff by the operators in 1918. Records of these holes are not now available. Pardee states that "the other workings, including 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." The drilling was reported to have covered 3 or 4 acres.

ECONOMIC FACTORS:

Pardee states that "It is reasonably certain that the Tyrrell mine contains a large body of material that carries from 2 or 3 percent manganese, the richer parts of which are probably workable under conditions approximating those of 1918."

Assuming ~~max~~ an area of 4 acres underlain by an average of 15 feet of minable ore, there would be a reserve of something over 200,000 tons. It is entirely possible that a greater area than 4 acres could be proved. Judging by the surface exposures, and without a knowledge of the drill hole results, there would be a certain proportion of the whole which would be too low grade to mine even under emergency conditions. The tuff outcrops over some of the northern part of the area with little overburden, and probably could be mined by surface methods. The thickness of capping and the distribution of the minable grade would determine whether surface or underground mining would be necessary for the major part of the deposit.

Except for transportation facilities, operating conditions are favorable. The climate is generally mild. Water is available, although storage in Lost Creek or some other source of supply might be necessary during the dry season. The nearest rail shipping point is Eagle Point, at a distance of about 17 miles by road.

A concentrating or lixiviation plant would be necessary, but it is probable that a good recovery of mineral could be made by combining mechanical and flotation methods; and that, in the case of lixiviation, percolation would be satisfactory with relatively coarse crushing. Should fine grinding be necessary, the texture of the metallized portions of the tuff should allow this with a minimum of wear on the grinding parts.

Any producing operation in this area should be preceded by extensive drilling to determine the extent, grade and distribution of the manganese minerals. Should a sufficient tonnage of minable grade be proved, it would be essential to work out an economic metallurgical process for recovering the manganese in a concentrated form before mining operations were attempted. In this process it would be determined whether or not the gold could be saved economically.



STATE DEPARTMENT OF GEOLOGY AND
MINERAL INDUSTRIES

STATE ASSAY LABORATORY
802 EAST H STREET
GRANTS PASS, OREGON

ASSAY REPORT

December 22, 1937

Mr. Karl K. Nixon, Director
State Department of Geology and
Mineral Industries
704 Lewis Building
Portland, Oregon

Following are the results of assays made on samples
submitted to the Assay Laboratory by Mr. Libbey:

<u>Office number</u>	<u>Sample number</u>	<u>Manganese, percent</u>	<u>Gold</u>		<u>Silver</u>	
			<u>Oz./ton</u>	<u>\$/ton</u>	<u>Oz./ton</u>	<u>\$/ton</u>
555	1	2.47				
556	2	0.47				
557	3	2.41				
558	4	8.20				
559	5	1.96				
560	6	0.48				
561	7	4.96				
562	8	6.70				
512	9	0.25	Trace		Blank	
513	10	2.87	0.02	0.70	Blank	
514	11	17.31	0.01	0.35	Blank	

Signed... *Albert A. Lewis*
Assayer

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