CONTENTS.

TYRRELL MANGANESE MINE,

SUMMARY.

Note:- As stated in the accompanying Report, a core drilling campaign is desirable to accurately determine the depth and tenor of the ore now known to exist in this property. If this drilling can be started and, after a few holes have been put down with satisfactory results, work on the development, roads, and mill construction can be immediately started, the work and completion to a point of production can be greatly facilitated and the overhead cost considerably reduced by the shortening of the time of completion. In the present war emergency it appears to the writer that such a course is justified rather than to await the completion of the entire drilling program before commencing the construction of the milling and concentration plant, hence I am showing two estimates of the cost of putting this, and adjacent, properties into production, one based on the completion of the drilling prior to applying for a loan sufficient for the equipment for operation, the other based on drilling a few holes to check the estimated depths of the orebody and then being in a position to start the mill construction and other work essential to production while continuing the drilling program to better check the average depths and values of the orebody and aid in planning the extraction to the best advantage.

Based on present indications, before core drilling has been started and a reasonable amount of such work completed, the ore reserves in the Tyrrell Mine may be estimated at some 200,000 tons. The previous work on this property, during the World War, indicated an average value of from 14% to 16% but for the purposes of this report I am estimating on an average content of 7% Mn. and an extraction of 80% of that content as shown by certain concentration tests reported by Minerals Separation North American Corporation appended hereto, making an average recovery of 5.6% Mn. On this we may figure:-

Total probable production of 47% Mn.concentrates from the Tyrrell property alone.....	11,800 tons.	
Total value of this production @ $1.00 per unit.....		$526,000.00
Amortise plant and equipment.....		100,000.00
		$426,000.00
Less cost of working 200,000 tons @ $1.45 per ton.....		290,000.00
	Net	$136,400.00

Add an approximate 90,000 tons from the adjoining claims,
Add an approximate 90,000 tons from the Peah property which we have partially examined and a similar amount from the property of Timber Products and B.M.Bush and other claims in the vicinity which will be tributary to the proposed mill and estimating an additional cost of 55¢ per ton due to hauling to mill, we have an additional 200,000 to 300,000 tons of similar ore which can be mined and milled, which at 5.6% recovery will more than double the total production of the Tyrrell Mine and as the equipment has been amortised from Tyrrel account, we will have but the working cost @ $2.00 per ton with $5.60 per ton ore value from which it is deductible or a profit of $3.60 per ton on all similar ores of the vicinity which may be developed during the Tyrrell operation, a probable 300,000 ton minimum.

TYRRELL MANGANESE MINE.

ESTIMATES.

Core drilling	$5,000.00	
Supervision and mapping	1,000.00	
Assaying	750.00	
Bulldozing and road work	1,000.00	
Accounting and overhead	1,250.00	
Other miscellaneous work	1,000.00	
Tools and equipment	2,500.00	
Freight and travelling expense	500.00	
Fuel, lubrication, tires and auto exp.	500.00	
Water supply for drill	500.00	
Contingencies	1,000.00	
	$15,000.00	$15,000.00
Overhead during period between end of drilling campaign and granting of equipment loan, est. at a minimum of 90 days @ $1000.00 per month	$3,000.00	3,000.00
Report etc. to accompany application for loan	500.00	500.00

CONSTRUCTION:-

Road building	$ 5,000.00	
Camp buildings inc. assay office	5,000.00	
Pumps and piping for water supply	1,000.00	
Buildings, fdns. and labor for same	750.00	
Land for millsite and tailings pond	1,000.00	
Grading for mill fdns. 100 cy at $4.00	400.00	
Concrete for same, 30 cy at $10.00	300.00	
500 ton ore bin, wood construction	750.00	
grizzly, crusher, and feeder	1,350.00	
No. 86 Marcy Mill and spares	18,000.00	
1- Symons vibrating screen, 4 products	3,500.00	
20- Wemco concentrators or equiv.	9,000.00	
* Power plant, Diesel Elec. 500 H.P.	25,000.00	
Assay office equipment	500.00	
Engineering and supervision	5,000.00	
Laundere and piping	1,000.00	
* 100,000 gal. water tank	1,000.00	
100 ton dewatering tank for concentrates	750.00	
1- small dryer for concentrates	750.00	
Sacking and weighing devices	750.00	
* 100 ton concentrate bin, steel	350.00	
Labor for erection	4,000.00	
Contingencies	4,850.00	
	$90,000.00	90,000.00
1- 1 Cu.yd. Diesel shovel	16,500.00	
1- D.8 Tractor and dozer	10,000.00	
1- 5000 gal. fuel tank	750.00	
	$27,250.00	27,250.00
		$ 135,750.00
1 months payroll and exp.	5000.00	
fuel, lubricants, powder etc.	9,250.00	
	$14,250.00	14,250.00
		$150,000.00

The above has been prepared using such price quotations as are available and knowledge of former installations of similar nature. If the entire sum necessary for both drilling campaign and equipment can be available at one time this sum may be materially reduced as shown on succeeding page.

* Denotes used material.

TYRRELL MANGANESE MINE,

ESTIMATE NO.2.

Core drilling.....	$ 5,000.00		
Supervision and mapping.....	500.00		
Assaying.....	250.00		
Accounting and overhead.....	750.00		
Tools and equipment.....	2,500.00		
Freight and travelling expense...	500.00		
Fuel,lubrication, tires and auto.	350.00		
Water supply for drill.....	500.00		
	$10,350.00		$10,350.00
Road building & stripping.....	5,000.00		
Camp buildings & assay office....	5,000.00		
Pumps and piping for water supply	1,000.00		
Building, Fdns.,and labor on same	750.00		
Land for millsite and tailings...	1,000.00		
Grading for foundations.....	400.00		
Concrete for same.....	300.00		
500 ton ore bin,wood const.	750.00		
* Grizzly, crusher & feeder.....	1,000.00		
* No. 86 Marcy Mill.....	8,000.00		
* 20 Wemco concentrators or equiv.	7,000.00		
* Power plant,Diesel elect. *	20,000.00		
Assay office equipment.....	500.00		
Engineering & supervision.....	3,500.00		
Launders and piping.....	1,000.00		
* 100000 gal. water tank.....	1,000.00		
* 100 ton dewatering tank.....	550.00		
1- small dryer for cones.	300.00		
* Sacking and weighing devices.....	450.00		
* 100 ton conc. bin, steel, ...	350.00		
Labor for erection.....	3,500.00		
Contingencies.....	3,000.00		
	$64,500.00		64,500.00
* 1- 1 C.Y.Diesel shovel on cats...	12,500.00		
* 1- D.8 Tractor and dozer.....	7,500.00		
* 1- 5000 gallon fuel tank.....	500.00		
	$20,500.00		20,500.00
1- months payroll and exp.	5,000.00		
Fuel,lubricants,powder, etc. spares and supplies.....	9,250.00		
	$14,250.00		14,250.00
		Total	$109,550.00

This sum may be reduced to an even $100,000.00 or less by purchasing shovel and tractor on monthly payments.

THE TYRRELL MANGANESE MINE

The Tyrrell Ranch and Manganese Mine, properties lying in Sections 3, 9, and 10, Township 37 South, Range Two East, Willamette Meridian, were purchased in May 1942, by George L. deMartini of San Francisco, California and are now owned by him in fee and of record in the Recorders Office of Jackson County, Oregon, in Medford, the County Seat.

These properties comprise the S.W. 1/4 of the S.W. 1/4 of Section 3; the W. 1/2 of the N.W. 1/4 of Section 10, the South 1/2 of the N.E. 1/4 of Sec. 9, and the S. 1/2 of the N.E. 1/4 of the N.E. 1/4 of Sec. 9 of the above Township together with all tenements and hereditaments, water rights, etc. appertaining thereto. It may be mentioned here that the water rights are the first water rights on Lost Creek and together with those of John Walch who owns property to the North and West, are the rights to the entire creek flow at the usual stages of water.

The manganese bearing lands comprise the eastern portion of the property, to wit: The S.W. 1/4 of the S.W. 1/4 of Sec. 3 and the W. 1/2 of the N.W. 1/4 of Sec. 10. The lands in Sec. 9 are apparently free of manganese with the exception of float which has slid down from Sec. 10. The property also holds by lease from the U. S. Government, the grazing privileges on the E. 1/2 of the S.E. 1/4 of Sec. 9, some 80 acres more or less and the W. 1/2 of the S.W. 1/4 of Sec. 10, another 80 acres. On this latter parcel some mineral claims have been located and are now being prospected by other parties.

The manganese, which is the valuable and pertinent deposit on which this report is being written, lies in a layer of red tuff, underlain and at one time overlain by basaltic flows. The ore occurs in the form of manganite in nodules and small particles, together with some pyrolusite, some psilomelane, and some soft, brown oxides of a bronzy appearance. The harder, and larger, particles are readily concentrated after grinding, by gravity methods, and the lighter tuff washed away. Some of the softer oxides are light and float away with the tails but a 79% plus concentrate has been made in laboratory tests with a prospect of a still higher extraction when worked on a commercial scale.

HISTORY - The existence of this body of manganese bearing tuff has been known for many years and during World War No. 1 the property was taken over by the Manganese Metals Company and equipped with a crudely constructed mill of small capacity. Tunnels were driven from the West slope into the tuff on the N.W. 1/4 of the S.W. 1/4 of Section 10 and on the S.W. 1/4 of the N.W. 1/4 of Sec. 10. A tramway and track was run along the

West side of the hill at about the elevation of the ore occurrence and the mined ore sent down a chute to an ore bin, crushed with rolls, and concentrated in crude jigs and some very good concentrates were produced. No definite information can now be had as to the exact flow sheet or modus operandi and the ruins of the old mill are in such condition that no pertinent facts may be ascertained from its study. The authorities differ as to capacity of mill and amount of concentrate produced but it seems reasonable to assume, from such information as can be obtained that the flow sheet was approximately as outlined above and that something between 200 tons and 600 tons of concentrate were produced and that the mill capacity was about twenty tons per day, and the ore averaged between 15% and 20% Mn. The analyses of such concentrates are given in the various excerpts from Governmental Department Reports included herewith. A sample of concentrates found in the bottom of the old concentrate bin checked with reasonable accuracy with these former analyses.

DEVELOPMENT - The development, all old work, at the time of my arrival on the ground consisted of a couple of short tunnels close to each other and one of them on the north side of a diabase dike which cuts the formation in the N.W. 1/4 of S.W. 1/4 of Sec. 10. To the South of this dike there is little if any evidence of mineralization for a considerable distance. North of this work a distance of 100 feet or more a tunnel, crosscut, was driven into the orebody and drifts run to the North and South from this crosscut. All of these tunnels are caved and inaccessible but are being reopened by parties who have leases on this ground. It is reported that the drifts off the second crosscut tunnel mentioned extend from 70 ft. to 100 ft. in both directions. There is also a rumor that a shaft some 70 ft. deep was sunk from one of these drifts but I can find no corroboration of this statement and parties who claim to have worked in these drifts do not recall such a shaft. However, these openings will be cleared and accessible for examination in a short time. North of the center of Sec. 10 a similar tunnel was driven into the property under consideration and is similarly caved and but partially reopened to date. Ore from these old workings lies in small piles along the tramway hereinbefore mentioned, considerably altered by exposure to weather. As the work of reopening these old tunnels was progressing slowly and would probably be completed and accessible for examination at a later date, my explorations were mainly carried on towards the north to determine if possible the North-South extent of this orebody. The exposures along the West slope of the ridge were examined and sampled by panning and the orebody traced to approximately 1500 feet north of the South Line of the Tyrrell property. This with the exposure South of the Tyrrell South line and lying between it and the intrusive dike mentioned, gives a total exposure of approximately 2000 feet. Hand trenching was resorted to and some shallow shafts and long crosscut trenches of shallow depth were made and the underlying orebody reached in almost every instance. Owing

to the present scarcity of labor in the vicinity due to a Governmental project lying between here and Medford and on which a large number of men are employed, hand trenching proved too slow. A D-8 Caterpillar tractor and dozer were hired and a series of crosscut trenches 10 ft. wide cut across the surface East - West through the surface material down to the orebody. Owing to logging work on a Government contract for lumber the tractor could only be had for 24 hours but in this time a series of 11 trenches as described above were cut exposing the ore Southward to a point where the basaltic capping still remained and the dozer would not cut through to the orebody. This work demonstrated the existence of the orebody much further to the North than had been formerly been thought and of a greater width than had been assumed. To actually demonstrate and block for measurement and sampling, core drilling must be resorted to in these bulldozed trenches and an accurate survey of the orebody made and plotted. However, from this work it has been shown that a substantial body of ore remains and that it will probably be possible to work it by power shovel and opencut, commencing at the North end of the exposure and working South towards the dike above mentioned.

DRILLING - Some years ago Mr. Victor Rakowski is said to have had a series of holes drilled at one point to determine the depth of the ore bearing formation. No logs of these holes are obtainable at present date although through the courtesy of Mr. Earl K. Nixon, Director of the Department of Geology and Mineral Industries of the State of Oregon, we obtained photostats of a sketch topographic map and the location of the drill holes and a plotted cross section through one row of such holes. We also found and conversed with the driller who was in charge of the work but who simply drilled, kept no logs, and had but his memory as to the depths. The drill used was a churn drill of an antiquated and obsolete type, formerly operated by horses in a tread mill arrangement but later remodeled to drive with a gasoline engine. It drilled a 6" hole with a 600 pound string of tools and took over a month on four holes as shown by the photostats included in this Report. This drill was entirely unsuited to the work, the sludge recovered by pumping from the holes was probably panned but in such panning it is very probable that all of the pyrolusite and a portion at least of the manganite and the "other soft, bronzy looking oxides" would be lost as they would float readily. The information obtained by this former drilling was of very little value.

Core drilling should be resorted to and a campaign of drilling carried out to definitely block out and determine the values of this deposit. From the nature of the deposit, a soft tuff with particles and nodules of hard manganite dispersed through it, I am inclined to believe that anything smaller than a 3" core will be badly broken up; also that a drill of the Davis Calyx or the Sullivan type of bit will be more successful

than diamond drilling. I would advise that at least one drill hole per trench be immediately put down to the strata underlying the manganiferous body, to determine depth, character, and tenor of the deposit. Later the drilling should be continued until at least two holes in each of the shorter trenches and three or more in the longer trenches and some holes to the South towards the dike be completed so that the orebody may be accurately measured and valued. The sum of $5,000.00 should provide amply for this work including the supervision and surveying. The indications are that the expenditure of such a sum for this purpose is amply justified; that a large body of workable ore will be developed thereby.

GEOLOGY - The geology of this deposit has been covered by Dr. Pardee and Dr. Wells of the U.S.G.S. to the extent possible at the times of their respective visits. I append herewith a transcript of the pertinent sections of Pardee's published Report under the caption "Deposits of Manganese Ore in Montana, Utah, Oregon and Washington". A further transcript of the pertinent sections published in the Oregon State Department Bulletin No. 17 on Manganese in Oregon, dated 1942., and a further transcript of the context on the obverse side of the Map of the Preliminary Geology of the Medford Quadrangle by the U.S. Geological Survey and the Department of Geology and Mineral Industries of the State of Oregon and photostatic copies of the Geological and topographical maps of the pertinent region now procurable. Those transcripts and maps in themselves show the importance of a complete and thorough development, survey, and reduction of this and other adjacent manganese deposits of similar character so that their metal content may be turned over to the proper channels of industry immediately, or as soon as working conditions will permit.

TRANSPORTATION - The mine is reached over a dirt road from an improved highway leading from the Crater Lake Highway near Eagle Point through Brownsboro to Lake Creek Post Office and on to a farm road turning South from this highway at a point near the Little Butte Creek bridge, from which point a mile of rough dirt road fording Lost Creek gives access to the mine. The nearest railroad is at Eagle Point, approximately 13 miles distant. The nearest stockpile for such ores is at Grants Pass which will be slightly over 50 miles distant. It is probable that delivery at Eagle point may be arranged for as a point of acceptance of the concentrated product. In operation, the mine will be reached over a new road leading from a back road near the covered bridge across Lost Creek up a grade to the level of the orebody and along the ridge to the mine.

MILLING AND BENEFICIATION - I have mentioned the probable flow sheet of the former mill on this property. I append copies of letters from Minerals Separation, San Francisco Laboratory, showing results of some of their tests

on this ore and in one case an extraction of 79% plus of the manganese content by a very simple treatment. Mr. Earl K. Nixon of the Oregon State Department of Geology and Mineral Industries has recommended that we have further tests made by the U.S. Bureau of Mines, with a probability of betterment of the extraction. This I prefer to leave until after the drilling is either well under way or completed. A 79% extraction is 'good enough' as a basis for calculations at the present. It is very probable that some further treatment which may be worked out will save a goodly portion of the fine, light, pyrolusite and other soft oxides lost in the former treatments. These oxides will be of the grade known as 'battery ores' or chemical ores, and of much higher value per ton than the strictly metallurgical quality, and well worth saving.

A mill site has been selected on a steep, rocky, hillside to the North in the triangular tract bounded by the East-West line bounding the North end of the Tyrrell property and the county road and Lost Creek. An ample tailings deposit site lies adjacent in the same 'quarter quarter' Section between the old county road and the South Fork of Little Butte Creek. A pumping station at this point will provide ample water for milling purposes. The concentrates may be put on trucks from an ore bin adjacent to this old road to which they will be delivered by gravity flow from the mill. An almost level road can be made to the mill ore bin from the mine where power shovel will load to large trucks for transportation of ore to mill.

The mill flow sheet indicated by present experiments on the ore is simple. The shovel will deliver the ore sufficiently finely broken to feed to an 86 Marcy Mill which should have on this ore from 500 to 800 tons daily capacity to 20 mesh. Grinding balls of not too large size not to grind too fine, are indicated as essential. Classification preferably by a vibrating screen separating into three or four classified products from 20 mesh to possible 60 mesh with treatment on Wilfley tables of each separate product is indicated. The very fine material and the slimes may probably be further treated by some flotation system for the recovery of the soft, porous oxides. All of this is O.E.D.

MILL CAPACITY - The recommendation of a mill of this size for an orebody of the size now demonstrated may require further explanation. First: the comparatively low grade of the ore makes quantity production essential to low costs of operation. Second, the Government needs the concentrate as rapidly as it may be produced to meet the present emergencies. Third at least four other, smaller, bodies of similar ore within a reasonable radius will, from present observations, augment the probable ore supply for this mill 50% and possibly 100% when properly explored and developed. Experts have expressed opinions as to the duration of the present war as a minimum of at least three years. To be of use in this emergency production must commence as soon as

possible and at as high a rate as is possible.
Fourth: at least two Marcy Mills of the size indicated are available now at reduced prices in good, used, condition and Wilfley tables, commonly used in the concentration of gold ores, are also available. Small pumps, used piping or tubing, and other needs may be procured in good used condition. The California & Oregon Power Company have indicated a probable cost of $30,000 for extending a power line to the property which is of course a sum not to be considered for a probable three year use of the available energy so a Diesel installation, with suitable used equipment, is indicated. It is probable that such a power plant should be in two or three units any one of which would suffice to drive the 36 Marcy, say 300 H.P. and one unit at least should be used for driving a generator for electric power for pumps, concentrators, floodlights in pit, etc. etc. I estimate that with the sum of $5,000.00 indicated as essential for drilling and development, a similar sum for roads; some $40,000.00 for the mill and equipment and $10,000.00 for camp and office buildings and equipment the property may be put in production. The power shovels and trucks necessary would be purchased in good, used and reconditioned shape on a down payment and monthly installments on balance to keep within these figures. The mill and tailings disposal sites will probably cost in the vicinity of $1000.00 which will be cash prices.

COST OF OPERATION - For the Tyrrell property itself, all within a 3/4 mile distance of the mill, with a capacity of 500 tons daily, and estimating the ore tenor at 7% or less than half that indicated by former operations, with an 80% recovery or 5.6% it will be necessary to mine, mill and concentrate 9 tons into one. At the rate of 500 tons per day I estimate costs of mining and milling approximately as follows:

Shovelling and loading	30¢
Transportation	15¢
Milling and concentrating	50¢
Overhead	50¢
Total -	$1.45

9 tons @ $1.45 per ton - $12.05
Produces one ton of concentrates worth $45.00
Net - $32.95

It seems very probable that a higher grade of heads may be maintained but this is a matter which can only be determined by drilling campaign suggested herein or by actual mining. The actual mining should be preceeded by the drilling as a precautionary measure.

QUANTITY IN SIGHT - From the previous records and the amount of personal study in the field which I have been able to give this proposition, I deduce: Previous operators and explorers have seemed to agree on an average workable depth

of deposit of 30 feet. This is an estimate only and must be confirmed by drilling or other means. The previous drilling with churn drill I do not consider as giving much, if any, accurate information. The sketched cross section shows greater depths of overburden than was determined by the dozing operations and other trenching, the line of drill holes cannot be accurately determined either on the ground or on the former maps. The recent trenching by hand and with dozer seems to indicate that the formation extends to a point some 1300 or 1400 feet north of the South end line of the property and to a distance of 500 feet or more to the diabase dike to the South. Assuming, prior to the drilling that this ore body is 1300 feet long and 60 ft. in width (although we know that in places it is a great deal wider), and of the former assumed or perhaps 'determined' depth, and allowing 12 cubic feet in place to equal a ton, would give an estimated 200,000 tons. The extension to the South from the Tyrrell property to the intrusive dike, calculated on the same basis, would give an additional 90,000 tons. Estimating the Peck deposit, a 40 acre tract of similar ore lying approximately 1-1/2 miles to the N.E. and of which a casual examination has been made, the amount may be augmented by another 90,000 tons. Three other allegedly similar deposits within a two mile radius from the property remain to be examined. It may be stated here that these other deposits, outside of the Tyrrell property proper, are none of them large enough to be worked and milled profitably by themselves, must preferably be worked through the mill contemplated. In the case of the ores lying immediately adjacent to the Tyrrell on the South, the extension of the Tyrrell deposit, they are so situated that a water supply for milling and beneficiation is a vital question. Such water may be taken from Little Butte Creek and pumped to the logical mill site for this ore but the installation and operation would be costly. The Tyrrell property controls all the water of Lost Creek, hence this ore cannot be worked with that water unless worked by the interests owning the Tyrrell. Hence it is apparent that a sufficient quantity can be determined at the start to warrant the construction of a mill of the size indicated.

GRADE OF ORE - The grade of ore may better be determined after the drilling program is completed that at present. Samples taken at random over the entire length of the property were submitted to the Minerals Separation Company, San Francisco, California, laboratory for concentration tests. These samples assayed 18.22% to 26.45%, Mn. Other samples taken at random from the surface trenches carried approximately the same values. Pardee states that "The ore treated in the mill is reported to have averaged about 20% Mn.". He also mentions a 12 ft. sample in the 'main cut' as having been taken by Parks which showed 14.80% Mn., and the minimum as being 8.13% Mn. The evidence seems to show that the lower portions of the orebody are higher grade than at the surface. In my estimates I have taken 7%, app. one half the values shown by such sampling surface exposures, as being a safe average tenor for such estimates of cost and

probable production which, figured on an 80% average extraction basis, shows a 5.6% average recovery which is ample for a profitable operation on a 100 ton per diem basis. The former work indicates a concentrate assaying "from 46.5% to 52.8% Mn. with a silica content around 10% to 11%, and 1.6% to 3% of iron. Some reports tend to show a gold content in these concentrates of an average of $2.00 per ton but this is probably not recoverable, no work has thus far been done to determine if extraction is possible. All attention has been given to the war mineral. The letters and details of tests made by Minerals Separation Co. on the samples sent in by me are appended for your study and information.

MAPS - I have prepared and appended Maps of the property and the district as follows:

No. 1 - Portion of Township 37 South, Range 2 East, W.M. showing the property and adjoining roads, creeks, etc.

No. 2 - Portions of Secs. 3, 9, and 10 of Twp. 37 S., R. 2 E. showing the property and the adjoining grazing leases, ditches, etc.

No. 3 - Photostat of topography of the vicinity of the Tyrrell Mine made from the Ashland Quadrangle.

No. 4 - Photostat of the topography of the vicinity of the Tyrrell Mine made from the Medford Quadrangle.

No. 5 - Photostat of the areal geology taken from the Quadrangle of preliminary Geology, Medford, Oregon.

No. 6 - Photostat of topographic map prepared for the Manganese Metals Company showing a portion of the Tyrrell Mine.

No. 7 - Photostat of cross section showing the Rakowski drilling.

No. 8 - Sketch Map prepared from Brunton traverse to show locations of trenches and bulldozer cuts and other mine test pits.

PHOTOGRAPHS - Photographs are appended showing the work in the bulldozer cuts and trenches. Particular attention is called to the massive outcrops shown in photos 5, 6, and 10, and to Nos. 7 and 8. No. 8 shows men at work clearing the tunnel off the open cut on the property lying to the South of the Tyrrell Mine in Sec. 10 and No. 7 was taken from the surface near the top of this cut to show the basalt capping at this point. The other photos are self explanatory.

A detailed description of Map No. 8 seems desirable. Starting at the North end of the area shown some shallow shafts were put down to determine if the manganese bearing formation extended thus far North. In all of these we find a layer of white tuff a short distance below the surface. This layer of white tuff is said to overlie the red manganese bearing tuff. The white tuff is also exposed in bulldozer cuts No. 1 and No. 2. In No. 3 the red, manganese bearing tuff was exposed at a very little distance below the surface and this was also the case from this point up to cut No. 9. Nos. 10 and 11 found the basalt capping a very short distance below the surface and this cap continues from here to the intrusive dike to the South which cuts off the mineralization.

Along the West rim of the hill from the point marked "Massive Outcrop" we find the ore bearing formation exposed continuously from thence to the dike before mentioned. At the open cut and tunnel shown in Photo No. 8 the basalt cap is some 20 ft. thick and probably increases in thickness towards the crest of the ridge. From this point the capping gradually diminishes in thickness along the ridge until between B.M. Cuts 9 and 10 it practically disappears, having been eroded although traces were found in the cuts in this vicinity.

Pardee mentions the Newstrom, a property 2 miles North of the Tyrrell; The Star P. five miles North; the property of the Sierra Metals Company some three miles Southwest of the Tyrrell; as being worth further investigation. The Peck property lying app. a mile to the Northeast of the Tyrrell I have looked over casually and found it well worth further examination and development. Other properties in the vicinity, among them the one formerly known as the Germell, at the head of Coon Creek and 2-1/2 miles distant to the Southwest may also be classed as being one worth further investigation and development to augment the ore tributary to the contemplated 500 ton mill. However, the best plan is to rush production on the Tyrrell and as soon as this work is well under way to start development on the other nearby properties and rush the ore from them to the mill.

A portion of the Tyrrell, overlain by the basaltic capping, will of necessity have to be stripped down to the ore bearing strata. A large part of this stripping should be done in advance of the actual mining and the surface basalt crushed for road metal and concrete for the mill foundations etc. This will both uncover the ore and provide material greatly needed for the road and foundation construction.

In conclusion: From present appearances the Tyrrell Manganese Mine appears to be a property which if developed and operated along the lines indicated should pay handsomely and should produce several thousand tons of excellent grade of manganese concentrates which have a ready market.

All of which is respectfully submitted.

EXCERPT FROM

BULLETIN 725-C

UNITED STATES GEOLOGICAL SURVEY

By

J. T. PARDEE

1921

Page 219 et seq.

Mines and Prospects.

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 of 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 diabase 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 intervals for 1,000 feet or more northward to the turn or nose 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 manganiferous material. South of the main cut the ore-bearing layer is but 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 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.

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 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 most 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 52.8 per cent of manganese, 11.1 to 14.5 per cent of silica, 1.4 to 0.9 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 percent 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 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.

EXCERPT FROM

MANGANESE IN OREGON

Bulletin No. 17

STATE OF OREGON

DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

1 9 4 2

TYRRELL MINE

TYRRELL MINE — Lake Creek Area

(formerly known as Manganese Metals Co.)

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

Location: W½ NW¼ sec. 10, T. 37 S., R. 2E., extending into W½ SW¼ sec. 10 and S½ SW¼ 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 10 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 crystals 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 14.36 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 52.3 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 out by the Hodge survey (37:15) showed:

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

Manganese	55.00%
SiO_2	9.36
Fe_2O_3 & FeO	2.40
P_2O_5	0.045

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

Manganese	12.74

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

	Libbey	Webber	
	Mn	Mn	Fe
#1	2.47%	2.55%	7.6%
2	0.47	0.58	5.1
3	2.41	2.44	7.8
4	8.20	7.03	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 highest 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 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.

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".

*op. cit.

TRANSCRIPT OF CONTEX re TIRRELL MINE

On Obverse side of the

MEDINOS QUADRANGLE

PRELIMINARY GEOLOGY

MANGANESE

Two types of manganese deposits are found in the Medford Quadrangle; rhodonite-bearing veins and lenses along bedding or cleavage planes, and deposits of oxides and hydroxides of manganese, which fill open spaces. The rhodonite deposits occur only in the pre-Cretaceous rocks of the western part of the area, and are best illustrated by Bailey's prospect (No. 15). Rhodonite, a manganese silicate, has a vitreous luster, is commonly pink, and cannot be scratched by a knife. In all these veins the rhodonite from the surface to a depth of several feet has been partly or completely changed by weathering to black manganese oxides. As no economic method of obtaining manganese from rhodonite has been devised, deposits of this mineral have no commercial value at present.

Deposits of manganese oxide filling open spaces are found in the Tertiary volcanic rocks of the eastern part of the Medford Quadrangle. All found thus far lie within the Lake Creek district, an indefinitely bounded area that includes the drainage basin of Little Butte Creek east of Eagle Point and the contiguous area just north of the Medford Quadrangle. Outcrops of manganiferous material are scattered throughout the district and the rocks that contain them are commonly colored dark 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 .5 to 3 percent of manganese, but at the Tyrrel Mine (No. 6) and at Newstrom Prospect (No. 5) 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.

Although these conditions have accounted for the largest deposits, prospects are present in vesicular flows (for example, the Vestal and Black prospects north of the quadrangle), but they are also in the same general part of the volcanic series as the breccia member.

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 silicaand 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 manganiferous 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.

The Newstrom (No. 5) and Tyrrell Mine (No. 6) are the two most promising prospects in the area. Other prospects are the Brown (No. 4), Just (No. 7), Fox (No. 8), and Coon Creek (No. 9) prospects.

(Tyrrell Property)

REAGENT LIST

Na_2CO_3	Soda Ash
	Sodium Silicate
61 A	Sodium Oleate
40 E	Commercial Oleic Acid

MINERALS SEPARATION NORTH AMERICAN CORPORATION.
220 Battery Street, San Francisco.

Sample of Manganese Ore from Tyrrell Property, near Lake Creek, Oregon, sent by Mr. Virgil L. Demartini and Mr. George L. Holmes.
Date: May 26, 1942.
TEST NO. 1
Sample No. 76293
Weight tested 1435 grams.
Reference: 34-273-1

			ASSAYS	DISTRIBUTION %
	Product	% Wt.	% Mn	Mn
	Heads		13.22 Assay	
76293	Heads	100.00	12.54 Calc.	100.00
76300	Table Conc.	15.47	47.58	58.69
76301	Table Midd.	9.33	14.11	10.49
76302	Table Tail	52.83	3.58	15.08
76303	Untreated Slimes	22.37	8.82	15.74
	Table Tail + Slimes	75.20	5.14	30.82

PROCEDURE: 20 mesh ore was deslimed. Sands were tabled one pass making Concentrate, Middling and Tailing. Middlings were retabled, making Concentrate and Tails. Like products were combined. Combined Concentrates were sized at 65 mesh. Oversize was reground to pass 65 mesh and the whole was then retabled three passes for clean concentrates. Resulting concentrates were combined for assay.

C. F. WILLIAMS

Engineer in charge of testing.

MINERALS SEPARATION NORTH AMERICAN CORPORATION.
220 Battery Street, San Francisco.

Sample of Manganese Ore from Tyrrell Property, near Lake Creek, Oregon, sent by Mr. Virgil L. Demartini and Mr. George L. Holmes.
Date: May 26, 1942.
TEST NO. 2
Sample No. 76293
Weight tested 190 grams.
Reference: 34-273-2

	Product	% Wt.	ASSAYS % Mn	DISTRIBUTION % Mn
	Heads	100.00	13.25 Calc.	100.00
76319	Flot. Conc.	10.55	39.67	31.59
76320	Table Conc.	9.09	48.23	33.10
76321	Flot. Midd.	7.92	14.93	8.93
76322	Table Tail	47.40	3.52	12.59
76323	Flot. Slime Tail	25.04	7.29	13.79
	Flot. Conc. + Table Conc.	19.64	43.63	64.69

PROCEDURE: Minus 65 mesh dry-ground ore was treated by flotation, making a rougher flotation concentrate and a tail. The flotation tail was deslimed and the sands tabled, making table concentrate and table tail. The flotation concentrate was recleaned once.

Rougher treatment

Sodium Silicate	1.5 lb/ton
Na_2CO_3	1.0 "
61 A	3.0 "
40 E	2.5 "

Conditioned 3 minutes.
Frothed 7 minutes.

Retreatment
No reagents.
Frothed 3 minutes.

C. F. WILLIAMS
Engineer in charge of testing.

MINERALS SEPARATION NORTH AMERICAN CORPORATION.
220 Battery Street, San Francisco.

Sample of Manganese Ore from TYRRELL MANGANESE MINE, Lake Creek, Oregon, sent by Mr. Virgil De Martini.
Date: June 10, 1942.
TEST NO. 1
Sample No. 76369
Weight tested 1254 grams.
Reference: 34-277-2

	Product	% Wt.	ASSAYS % Mn	DISTRIBUTION % Mn
			26.45 Assay	
	Head	100.00	26.17 Calc.	100.00
76376	Table Conc.	30.30	54.78	63.43
76377	Table Midd.	13.71	29.57	15.49
76378	Table Tail	35.65	5.57	7.59
76379	Slimes	20.34	17.35	13.49
Table Conc. + Table Midd.		44.01	46.93	78.92

Ratio of concentration 2.27 to 1

PROCEDURE: Minus 20 mesh dry-ground ore was deslimed. The sands were tabled making a finished Concentrate 1, a Middling and a Final Tail. The Middling was screened at 48 mesh and the oversize stage ground with intermediate screening at 48 mesh until all the pulp passed the screen. The -48 mesh Middling was tabled, making a finished Concentrate 2, and a Middling which in practice could be further sized and tabled for grade.

E. H. BROWN
Engineer in charge of testing.

Bulldozing Surface Trenches on Ore Deposit.

Surface Trenching
and
Sampling.

Along West Rim.

Open Cut No.1 South,
Showing Basalt Capping
and Working Tunnel.

Another Outcrop Along West Rim.

General View of Valley from Mine.

Notes on Tyrrell (Manganese) Mine

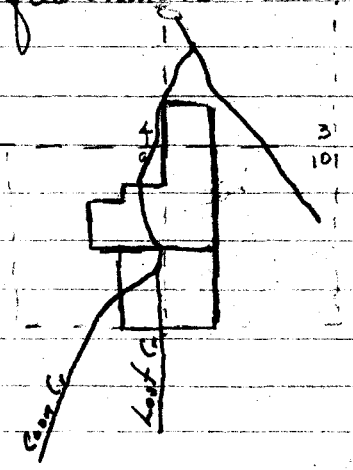
Address - Tyrrell Mine, Lake Cr., Ore

Wallace D. Lowry
George E. Murphy Jr.
July - Aug. 1942

Name — Tyrrell + associated Mn properties
Lake Cr. district, Jackson Co.

George de Martini — owner — 1234 Folsom St. San Francisco, Cal.
George L. Holmes — mining engineer — 24 California St. San Francisco, Cal

Claims located in Secs. 3, 9, 10 T 37S R 2E Wm.
Medford quadrangle



History — Some ore mined + milled during World War I. Probably 200 tons — estimates of produced concentrates (47 - 52.6% Mn)
Ore ran about 20% (Holmes)

May 22, 42 de Martini bought property from B.M. Bush acquired property from Tyrrell who first declared property

Tyrrell + assoc. properties, Lake Cr. district July 28, '42
Warm, clear ②
Secs 3, 4, 9, 10 T 37S R 2E El. 2200'±
Medford quadrangle

Investigation of type, location, and extent of manganiferous ore.

① Drift south of Tyrell property NW¼ SW¼ Sec 10 T 37S R 2E El. 2300'±

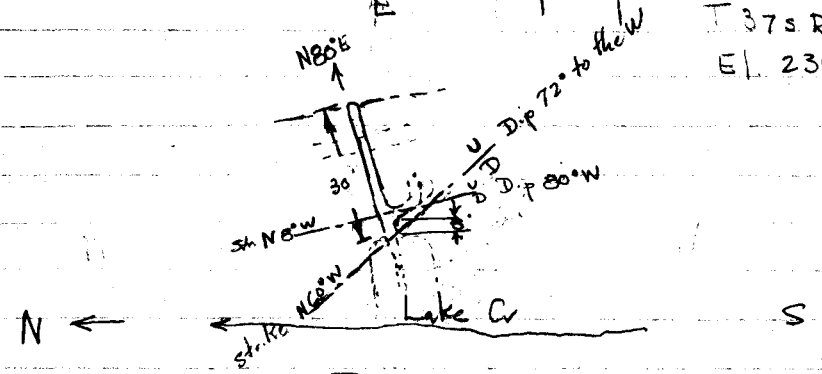


Diagram 1. Plan view
N

Rock at tunnel entrance is reddish brown fault breccia
Rock at E end of adit is slightly amygdaloidal + vesicular reddish gray basalt.

T (Tyrell) - 1 Manganite + associated (calcite?) carbonate in faulted zone near entrance
T - 2 Basaltic(?) rock with carbonate + Mn dioxide mineral crystals.

The main enrichment is found along the faulted zone near the entrance and peters out

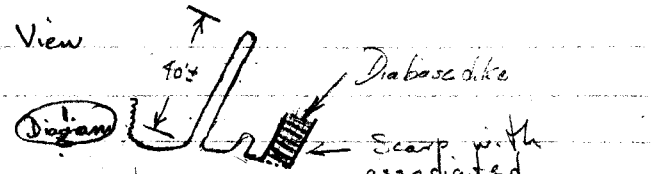
toward the E end of the drift. Some of the small faults show gouge. The enrichment in the faulted zone may be explained by the resultant greater permeability of the rock. West sides have moved relatively downward.

To the present, the occurrence seems associated with the contact between the capping flat basalt and the underlying tuff. A believed scoriaceous lower portion of the capping basalt may supply much of the Mn to leaching solutions which upon moving downward to the tuff and meeting possibly less pervious rock + a more acid rock, deposit the Mn in the form of manganite and associated oxides. Carbonate (calcite?) is also found with the manganese oxides + may have a similar origin, i.e. deposited as such from the leaching solution. If carbonate is present as calcite, then manganesiderite should be looked for.

Slickensides above the opening evidence relative downward movement of the west side. About 25' inside the drift on the N wall is slickensides. Metallic (MnO) smears(?) may indicate movement after mineralization though from lack of commonness of phenomenon, it is more likely slight recurrence of faulting after mineralization. Further examination shows that if there be smearing of Mn oxide, it is of little importance + may well not exist at all. Does not exist

Open cut + drifts to S of Diagram 1

Plan View



Cross Section

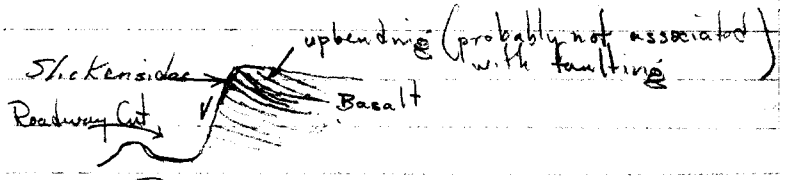


Diagram 2

T-3 Porphyritic basalt or diabase from dike ! Feldspar is andesine - labradorite

A slight enrichment occurs along the N side of the dike but there is no reason for believing that it has any connection with the Mn deposition as enrichment is more uniform than otherwise both in the brecciated rock to the N + occurrence of Mn is nearly as extensive ½ mi. to the N as here. The diabasic dike is the feeder source for the porphyritic basalt flows which occur on the top of the ridge somewhat to the SE

T-4 Porphyritic basalt

SW¼ NW¼ Sec 10 T 37 S R 2 E El. 2300'± ⑤

Several resistant chimney-or pinnacle-like rocks stick up 6' above the slope and above the old roadway level. The rock is a scoriaceous basalt probably preserved above slope level by its tenacity.

T-5 Scoriaceous basalt (?)

Check T-4 against T-8 + T-9 to prove existence of fault along Lost Cr. The rocks on both sides appear of similar character + sequence and the actual presence of fault zones, slickensides which indicate movement of the W block down (relatively) strongly support the idea of block faulting in this area.

Tyrrell + associated Manganese properties, Lake Cr. District ①
T 37S R2E Medford quadrangle

SW¼ NW¼ Sec 10 T 37 S R 2E El 2300' July 27 '42 Clear, warm
T-6 Scoriaceous basalt with manganite pockets
T-7 DK gray platy basalt

SW¼ SW¼ Sec 9 T 37S R2E El 2450'
T-8 Porphyritic basalt (andesine? feldspar)

SE¼ SE¼ Sec 8 T 37S R 2E El 2700'
T-9 Porphyritic basalt. Near it occurs tuffaceous andesitic basalt.

In the NW¼ Sec 16 occurs a fine platy dark gray basalt which may be the same as that capping the tuff across the creek to the NE. A fault may will exist but actual movement surfaces + definite correlation of rock types to prove repetition of sequence are needed to prove this idea If repetition is present, similar ores may be located along the contact between tuff + basalts in the surrounding areas

the manganese is restricted to the lower five or slightly more feet of the scoriaceous basalt. The fact that the mineralization is poor at the lower contact and that the mineralization is restricted to the lower portion of the scoriaceous basalt favors a leaching - deposition mode of origin. Though the manganese enrichment may occur to several or even 10' below the contact, it does not appear well developed immediately below the contact here though above the enrichment is marked. This is evidenced in the cuts some 100 yds to the N where the tuff is almost barren of manganese minerals or stains. Seams of a powdery white mineral slightly soluble hints that at times these tuffs were saturated with water + certain salts precipitated from solution. The mineral may be a massive form of gypsum ($CaSO_4 \cdot 2H_2O$) known as alabaster

No. 10 White ppt. of alabaster(?) + some clay with possibly adularia clay + carbonates

SE¼ NW¼ Sec 10 T 37 S R 2E El. 2250 ±

Again manganese mineralization occurs in the scoriaceous basalt. With it and in close association with the Mn oxide occurs various carbonates (calcite + Mn, Fe carbonate probably gradational)

No. 11 Red vesicular + scoriaceous basalt with Mn oxides + carbonates

The chemistry of the mineralization is not known but these suggestions are worth noting. The scoriaceous basalt (of manganiferous) allows ready percolation by meteoric waters charged with CO_2. The HCO_3^- ion may unite with the Mn^{++} ion (more soluble than Fe^{++}) to forms soluble $Mn(HCO_3)_2$. The meteoric waters percolate down through the scoriaceous basalt until they lose their motion due to the less pervious underlying tuff layer. Thus the zone of aeration or oxidation may be located for the most part above the zone of saturation the tuff forms. The O^{--} ions and OH^- ions in the solution, due to a slowing of motion of the water, have a chance to react with the Mn^{--} ions which have became concentrated by increased leaching from above. Thus various insoluble manganese oxides + oxy-hydroxides may form + being insoluble are precipitated where the solutions are found in the rocks, i.e. as fillings in cracks, crevices, and vesicles. Likewise the Ca^{++} ions (also leached from the rock by meteoric waters) react with the CO_3^{--} ions to form insoluble $CaCO_3$ + the Mn^{++} & Fe^{++} may form carbonates similarly.

I. Primary mineral (e.g. schefferite - a manganese pyroxene [Fe^{++} often present])

$RSiO_3$ $R = Mn^{++}$ + some Fe^{++}).

$Mn(Fe)SiO_3$

Solution by meteoric waters

$Mn(Fe)SiO_3 + H_2O + CO_2 \rightarrow Mn^{++}, Fe^{++} + HCO_3^- + H^+ + SiO_2$ (colloidal)

$\rightarrow Mn(HCO_3)_2 + SiO_2$ (colloidal)

Oxidation in zone of aeration

$Mn(HCO_3)_2 + O^{--} + H^+ + OH^- \rightarrow MnO_2$ + Mn oxy-hydroxides

Here CO_3^{--} may react with Ca^{++} to ppt $CaCO_3$

NW¼ Sec 15 T 37 S R 2 E El. 2300'±

Baker claim

The N portion of the workings to the N of the N consists of 2 drifts + one reported winze which may be seen by the ladder and timbers now largely covered up by back fall.

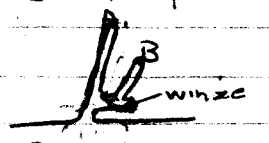
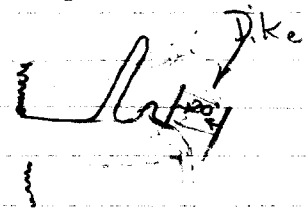


Diagram 3

Mineralization seems restricted largely to scoriaceous + opened areas in the fault zone. Barite present with the oxides. The material in the face of both drift A + B is little

mineralized. The rock is tight and probably a fine grained slightly porphyritic basalt. The pockets or vugs of manganese oxides are rhodonite + pyrolusite and have associated calcite. The open centers of many of these fillings + their divergent botryoidal character favors a formation of the manganese minerals by pptn from solution rather than by volcanic emanations. The lower contact of the basalt flows is not seen here.

S portion of workings



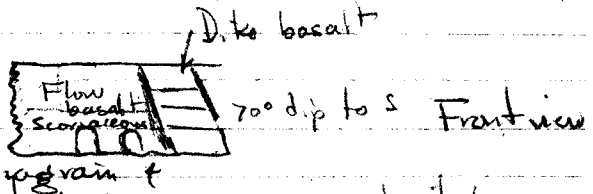
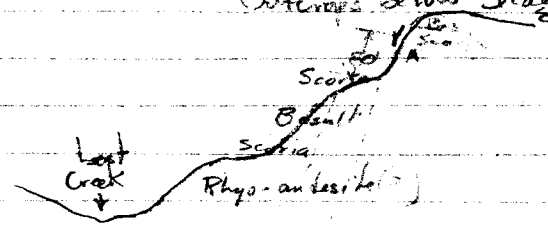


Diagram ↑

Mineralization here seems restricted largely to the scoriaceous layers. The showing in the tuff are poor. The basalt strikes about 10° W of N + dips several degrees to the E.

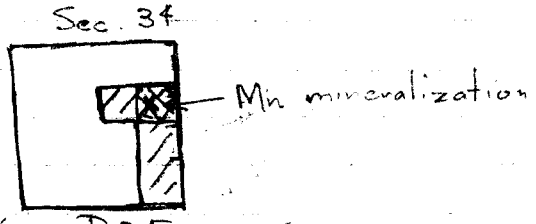
Outcrops below Diagram ↑ location



July 30, '42 (11)
Clear, warm

Newstrom Manganese property
NE ¼ Sec 34 T36SR2E El. 2500'
Lake Cr. district Jackson Co.
Medford quadrangle No. 5

deMartini is purchasing mineral rights from
Gus Pech (Peck) Lake Cr., Oregon
Peck purchased land from Krouse
Krouse got it from Nystrom. Scott



did work (prospecting) for Nystrom during
World War II. No ore mined or milled.

Location SE ¼ NE ¼ Sec 34 T36S R2E El 2600±
On West slope of W-facing scarp like
ridge front made up of basalt flows of
scoriaceous breccia + flow rock of
dense character. The ½ Section corner (Fe 04)
is ESE of the mine and somewhat SW of
large dead pine tree near top of ridge.
The SE section corner is SE of the Pech
house and some 50' E of the gate
along the road to the house. A fallen
laurel witness tree is to the S + a fallen
oak witness tree to the N. These may be

best means of tying in the survey here.

Mineralization – Stains + open fillings of manganese oxides (pyrolusite – wad) in a scoriaceous basaltic flow breccia or agglomerate. Oxides are scattered throughout the agglomerate and mineralization best in lowest 8', continues up 30'. If this agglomerate continues downward (as seems likely) then the mineralization may improve. Insufficient prospecting hampers an evaluation of the mineralization but it may be of economic value as shown: Panning, after grinding, indicates the Mn oxides separate quite well from the country rock. Grinding would appear to be a relatively simple process. Oxidation appears to have ~~ppted~~ the No. 12 Mineralized scoriaceous rock (basalt) Mn from meteoric solution. Mineralization is similar to that of the Tyrrell property to the S.

Workings Several (3 seen) W-E open cuts into ridge. From 10'-15' long.

Geology – The mineralized rock is a somewhat brecciated scoriaceous to vesicular basalt. This rock + more dense basalt appear to form the rest of the ridge above. Below 10'± appears to be the contact of basalt

with a possibly tuffaceous rock. The decrease in slope and light gray to cream soil indicate this though no exposures could be found. The rocks have a dip of several degrees to the east.

The hill to the SW of this property immediately W of Peck's house is made up of a medium grained basalt.

SE¼ Sec 34 T 36 S R 2 E
No. 13 Medium grained brown basalt.

There is some white tuff occurring well up the road to Pecks. This may be the tuff (?) underlying under the basalt flows at the open cuts.

Plane table survey of Tyrrell Manganese property Redmanio notes — July 3, '42 Clear, Warm

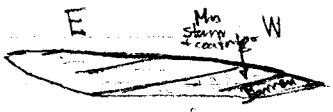
N

Station 1-0 — W Fence — Fence

Strike N80°W 1-1 Middle of E end of open cut (height of cut) No. 1
Test pit 24' to N - in soil and light brown tuff 10' deep, 7' N-S; 3' E-W No Mn mineralization

Road is between open cuts 1+2 + slightly (few ft.) E of E end of cuts

1-2 Middle W end of open cut 90' long x 12' wide
Depth of cut 8' at center to 0' at both ends.
Red, brown & gray tuff layers with slight dip (several degrees) 10°± to E. Irregular seams (1"-0") wide roughly ll to the bedding - probably gypsum (alabaster) 2' layer toward W end shows little Mn stain + mineralization; lowest horizon barren



Cross section - S wall

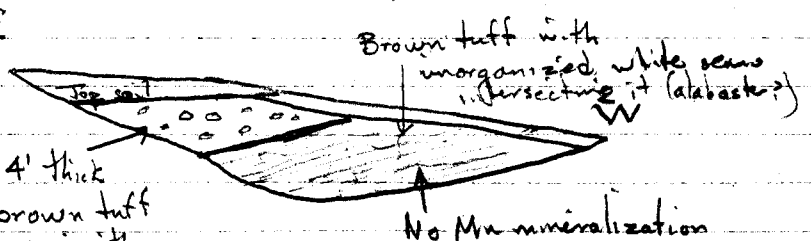
1-3 Test pit 8' deep, 8' N-S, 4' E-W
In tuff little Mn stain only

Another test pit 8' deep, 8' N-S, 4' E-W 36' N of 1-3 In brown tuff with 5' soil on top. No Mn shown

1-4 Middle E end of open cut No. 2
Both show slight Mn mineralization
Test pit 6' N of above cut near center 8' N-S, 2'-3' E-W, 4' deep
Test pit 4' S of above cut + soft above test pit 8' N-S, 2'-3' E-W, 4' deep

1-5 Middle W end of open cut No. 2 Strike N85°W
90' long × 12' wide, 0' both ends. 9' deep
at center (3' below elev. W. end shot (1-5)

Cross section of S wall

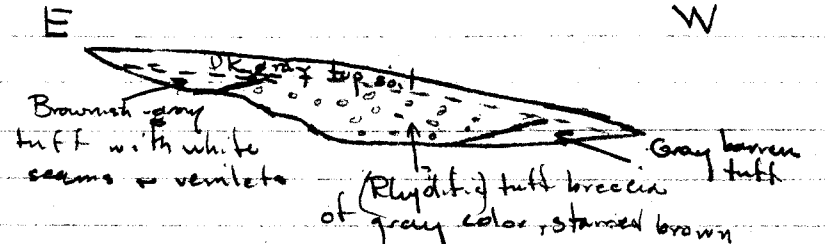


Mn stain & coatings in this horizon

1-6 Middle E end of open cut No. 3

1-7 Middle W end of open cut No. 3
80' long × 12' wide, 0' at both ends deep, 6' deep
near center Strike N 80° W

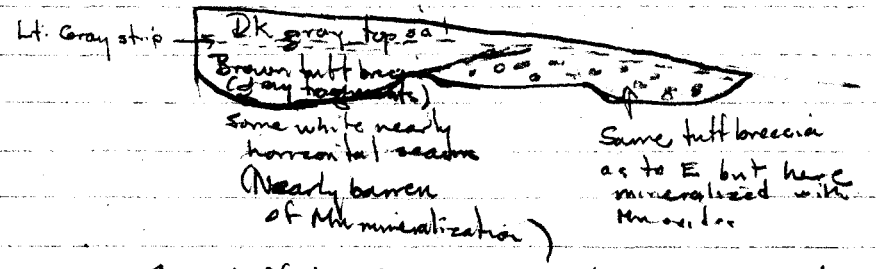
Cross section of S wall



Strike of beds is some 20° W of N. dip 10°-15° to the E

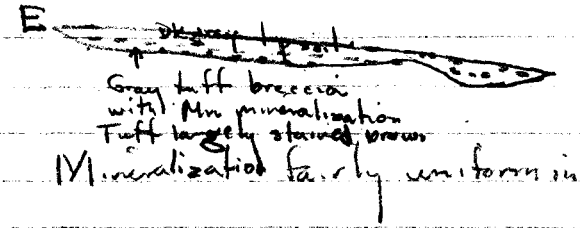
1-8 E end of man-made trench
1-9 W end of man-made trench Strike N70° W
60' long x 7' to 1' deep x 2' wide
Cross section of S wall

E W



This tuff breccia has a pseudo-pebble conglomerate appearance as the Mn tends to coat outside of gray breccia fragments, stained brown on the outside where Mn oxides have not coated them. Mn mineralization is better than at cuts No. 1 + No. 2

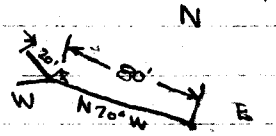
1-10 Middle E end of open cut No. 4
1-11 Middle W end of open cut No. 4
80' long x 12' wide x 0' both ends
Cross section

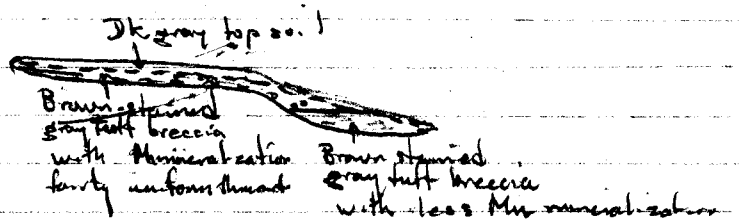


Mineralization fairly uniform in this cut

1-12 Middle E end of Open Cut No. 5

N 100' long x 12' wide x 2' deep





1-14 To Station 2-0 on E edge of road

2-0

2-1 E end of man-made trench

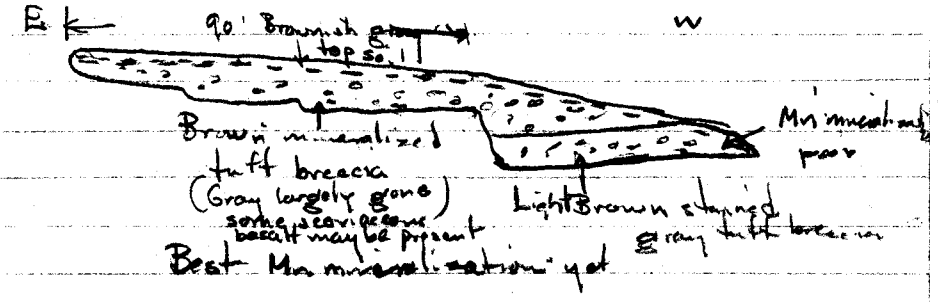
Open pit 20' to E. 6'-4' N-S, 3' E-W, 5' deep

Brown-stained gray tuff breccia with some Mn oxides shown throughout lower 5' of tuff

Trench Strike N-70° W

130' long x 2' wide by 2'-9' deep

Cross section of S wall

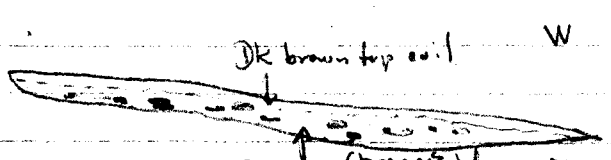


2-2 Middle of E end of Open Cut No. 6

2-3 Middle W end of Open Cut No. 6

Strike N 80° W

100' long x 12' wide x 0' both ends, ave. depth 2'

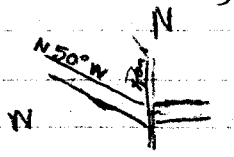


Gray agglomerate with reddish brown staining more common than gray color. Mn mineralization quite uniformly distributed but shallowness of cut prevents any conclusive idea as to its extent. There hasn't been a sharp break from the 1-7 to the present, i.e. since open cut No. 3

2-4 On road between open cuts to E + to W.

2-5 E end (middle) cut No. 7

~~2-6 W end (middle) cut No. 7~~



Aug. 1, 42
Clear, Warm

Tyrrell property
Sampling.
Location

Open cut along old roadway level and where agglomerate pillars are shown [Locate when surveying + mark]

Sample ① 6" channel cut approx. 1 inch deep in agglomerate in vertical direction for 6'2". Sample cone + quartered. This exposure is the best tenor of ore yet seen.

Sent to Grants Pass office of State Dept of Geol + Min. Ind. for assay.

Below this lower face the mineralization rapidly diminishes as shown for 1½'. Upwards the decrease is less rapid.

Sample ②

6" channel cut approx. 1" deep and 4' vertical extent. Ground is rising at bottom and that shown near opening floor may dip slightly to E.

Open cut along old road S of 1st location will be sketch. Sample cut from drift to E about 15' inside entrance on S wall. Is mineralization localized to faulting or

Sample ③

Main drift - Baker claim

6" wide "x 1" deep x 4' long vertical channel on back + N wall 6' inside drift opening. The ore here is spotted but rich in spots, being located in a fault zone. The assay on this is as high as can be expected from a fair sample of the better mineralization shown at any of the workings.

Aug. 3, '42
Clear, warm

Coon Cr. Manganese

S½ SE¼ Sec 20 T37S R2E El. 3100'
Lake Cr. district Jackson Co.
Medford quadrangle No. 9

C. H. Herman (vice-pres) Timber Products Co. owner
Medford, Oregon holds deed to property

Workings 6x4' shaft 24' deep. windlass
Country rock is red basaltic scoriaceous agglomerate and dk gray platy basalt. The agglomerate carries some manganese in the form of botryoidal coatings of psilomelane, wad etc. The breccia or agglomerate is underlain by platy basalt. Although the rock (agglomerate) in which the Mn occurs is similar to the Tyrrell property there is no contact with another fm shown in the vicinity. Volcanic bombs are found at times in the breccia. It would appear that no extensive mineralization has taken place as water may work through agglomerate to platy basalt without much loss of velocity. There is much agglomeratic material but everything hit showed only very little manganese. Much SiO_2 in basalt seems

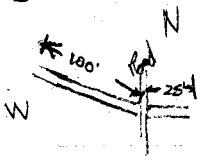
No. T-14 A & B Platy basalts
No. T-15 A Scoriaceous basalt with Mn oxides
B Scoria C. Mn oxides

Aug. 4, '42
V.S. cloudy, warm

Continue plane table survey

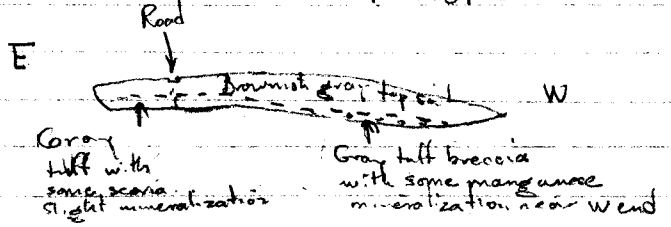
Open cut No. 7

Strike 125' long × 12' wide × 0' - 2⅓' deep.



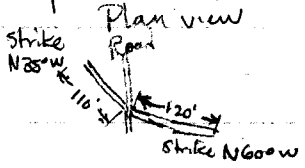
Plan view of cut

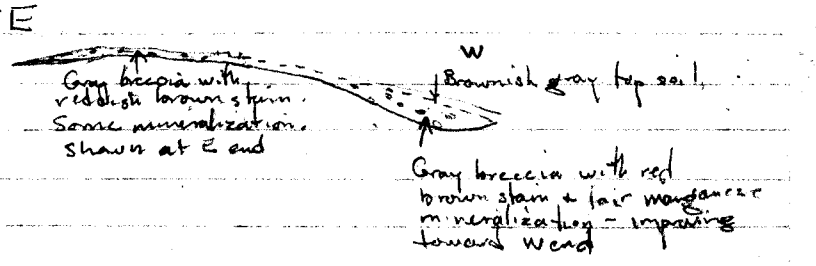
Cross section of side.



2-6 On road middle of cut No. 8

Open Cut No. 8 12' wide 0 - 2⅓' deep





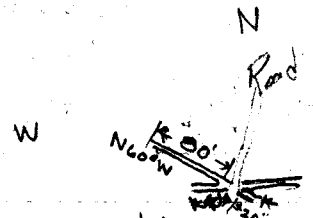
2-7 Station shot to E end of Open Cut No. 9

3-0

3-1 Middle W end Open Cut No. 9

3-2 Middle E end " " " "

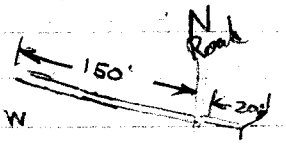
Plan view Open Cut No. 9



Open Cut No. 9 W of road shows very little Mn mineralization the rock is a phase of the basalt between the agglomeration at the lower W end of the cut and the platy basalt higher to the S of Sta 3-0. E of road there is but very little mineralization — only dendritic Mn stains on somewhat more dense basalt. Between open Cut No. 8 & No. 9 the mineralization rapidly peters out

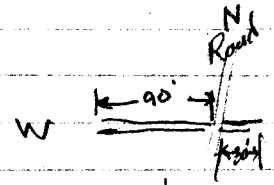
3-3 On road at Cut No. 10

Strike N 75° W



12' wide x 6" deep Cut is in dk gray fractured dense basalt (T-7) No Mn mineralization but Mn stains (coatings) often dendritic

3-4 On road at Cut No. 11



120' long x 12' wide x 6" deep In fractured dk gray slightly porphyritic basalt

3-5 Station shot to S

4-0 Dk gray basalt

4-1 Station shot to SSE, E of large colt

5-0 Dk gray basalt

5-1 Station shot to SW, 10' N of rail fence little above brow of hill

6-0 Dk gray basalt

6-1 Station shot to SW. Old road level, 40' N of largest open cut (Baker property)

7-0

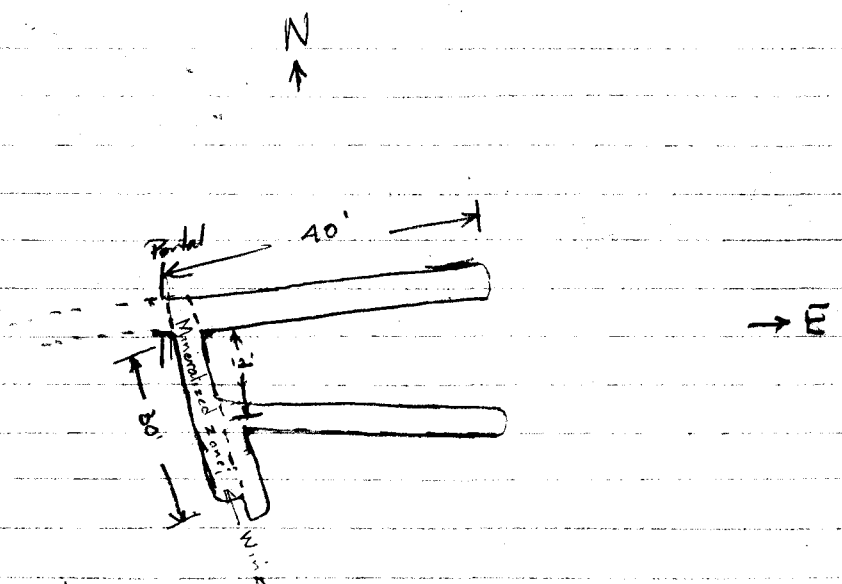
7-1 Top of E side open cut (15'-25' wide

7-2 S side of porphyritic basalt dike
Dike strikes N50°W. d.ps 70° to SW

7-3 N side of porphyritic basalt dike, directly above southernmost drift

7-4 To fault bounding E side of open cut at its N end. W block moved relatively down. Slickensided. Strike N15°W, d.ps 80° to W
Rock shows slight Mn mineralization.
Fault changes direction + swings to S 55° E strike + d.ps 70° to SSW

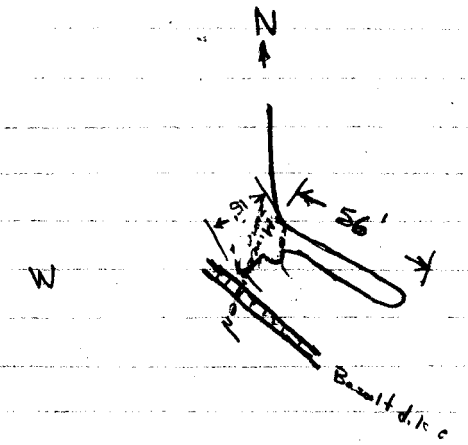
7-5 Portal level of northernmost drift of large Open Cut
Sample No. 3 cut from N wall of this drift 12' inside portal
Mineralization rapidly dies out 16' inside drift. Mineralization restricted to more porous portion of faulted + fractured basalt zone. Reddish-brown iron oxides also restricted to more open (hence more mineralized) section. The basalt here is very badly fractured + faulted. Much clay gouge + slickensides present



The mineralized zone here is 8' wide (E-W) + runs slightly E of south. Has nearly vertical attitude. Consists of two bolts 8" to 1½' wide. The mineralization here is confined to a badly faulted zone and the intersection of several faults may increase the porosity to permit mineralization. Both drifts E of crosscut to S show no Mn mineralization of note. Both are of no commercial interest

Fault Breccia zone W of portal is some 40' wide. This N 15°W - S 15°E trending fault zone is the main direction + displacement of the zone taken as a whole

Southernmost drift



Mn mineralization occurs in basaltic fault breccia. Some 15' wide, nearly vertical zone. Trend of zone N 15° W

7-6 To E-W fence Some mineralized agglomerate
7-7 Station shot to N on old road (tramway)
8-0 Porphyritic dk gray basalt
8-1 Station shot to N on old road
9-0 W of old drift tunnel Sample No. 2 cut near here
9-1 Portal opening of drift to east
Rock is a scoriaceous basaltic tuff breccia or agglomerate somewhat faulted in a N 20° W direction. Faults dip 80° to W. 1½ inch to 2 inch gauge zones. Displacements here are small, esp. in comparison to main fault zone which would be W of here. This rock is fairly uniformly mineralized and if the property be of

economic importance, then this is type of ore rock that must be counted on to give the main tonnage. Sample No. 2 was cut from this drift and is probably slightly below the average of the drift. As the Mn minerals are largely pyrolusite and wad, the recovery may be lowered due to flotation of these gangue minerals. The first agglomerate of similar character is seen near fence to S (7-6).

9-2 Station shot to N at end of old road

10-0 Rock is a reddish basalt agglomerate. Mn mineralization is shown to some degree in outcropping pinnacle rocks but is first of enriched occurrence at instrument level at this station (10-0)

10-1. Station shot to N. Sample No. 1 cut 20' ±
11-0 to E of station (11-0)

Aug. 6, '42

11-1 E to columns of basaltic agglomerate or coarse tuff breccia. Vesicular or scoriaceous texture. Sample No. 1 cut here. Here at lowest exposure is contact between agglomerate and red tuff at station (11-0) 1.m.l

11-2 Station shot to E

12-0 Lower 7½' of agglomerate well mineralized. Poor above

12-1 Tie-in shot to Sta. 3-0

1-16 Shot W to N-S fence, 230' S of gate
13-0

August 6, '42

Geology of Tyrrell property and environs

The manganese mineralization occurs in an agglomerate of basaltic composition. Overlying the agglomerate, probably gradationally, is a dk gray slightly porphyritic (labradorite phenocrysts) basalt. Spec. No. T-7. These rocks strike slightly west of north and dip 10° ± to the east. This platy basalt gives way to a coarser grained rock of basaltic character. Spec. No. T-4. A feldsitic source is ~~found~~.

As yet it can not be said what rock underlies the mineralized agglomerate. It may be a tuff of brownish color. Its composition can not be given.

A fault or fault zone fronts the ridge of the mineralized area, i.e. to the W. It strikes about N 20° W. A spring about halfway between Station 1-0 and 13-0 is supporting evidence for its continuation northward. Below the fault, to the W (around Sta. 13-0), dk gray basalt (equivalent to T-7) No. T-16 is underlain by a brown agglomerate or tuff breccia No. T-17. The dk gray

fine grained basalt is thought equivalent to the capping basalt of the mineralized agglomerate of the main ridge. Although coarser grained basalt and scoriaceous basalt are found around Sta. 13-0, the column may not be repeated here exactly by faulting - The basaltic flow rocks seem to have an E-W nearly vertical aligned flow structure in places. It is wondered if the brown tuff breccia found along the road slightly NE of the ranch house. There is chance that the tuff underlying the mineralized agglomerate is its correlative.

T-17 Tuff breccia
T-16 DK gray fine grained basalt

Aug. 7, '42
Clear, warm

SE corner Sec 4 T 37S R2E El. 1900'

Dk gray fine grained platy basalt overlies brown agglomerate. The basalt strikes about

T-18 A. Dk gray fine grained platy basalt B. Assoc. scoria
T-19 Brown tuff

N-S + dips several (10°±) to the E. To the E (Sec. 3) the basalt shows a vertical alignment which is believed related to faulting rather than a dike structure (fine grained + no limits) This area appears to be a portion of a block moved down in relation to the ridge to the E where the Mn claims are located.

SW¼ NE¼ Sec 3 T 37S R2E El. 1900'

A porphyritic dk gray basalt makes up this district and that to the S which forms the back slope of the ridge where the Mn mineralization is found.

T-20 Dk gray porphyritic basalt

Butte SW¼ Sec 10 T 37S R2E El. 2500-2700

This area is made up largely of dk gray porphyritic basalt. A white (andesitic?) tuff is believed to be an interflow in the basaltic series.

T-21 Dk gray porphyritic basalt
White tuff

T-22

SW corner Sec 3 T 37S R2E El. 2100'

T-23 Agglomerate

Ridge west of Lost Cr. This ridge is made up of basaltic flow rocks. Lots of geodes are found in the upper portions of this series. This reconnaissance was taken to try to check the sequence seen at the M property and also to ascertain if Lost Cr. follows a fault weakness. At the junction of Lost Cr. + Little Butte Cr. agglomerate crops out - not found W of the creek. Basalt was the rock forming the ridge to the W. No other types could be found in place tho several tuffaceous rocks were picked up. Vertical alignment of basalt flows may support faulting. The strike was roughly NW. One creek has its bed in rock fractured in such a direction.

Aug. 8, '42
Clear, warm

Tying in of survey:

Sta. 13-0

13-1 Shot to SW to believed quarter corner

13-2 Station shot to N (14-0)

14-0 8' N of E-W fence + 20' N of N-S fence at gate opening

14-1 Shot to brow of ridge (15-0)

15-0

15-1 Shot to section corner (NW corner sec 10).

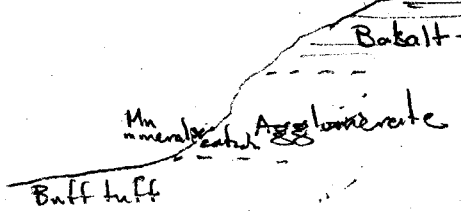
Aug. 10, '42
Clear, hot

Sec 34 T 36 S R 2 E El. 2500'±

Pech property No. 5 of Medford sheet

Geology

The manganese mineralization occurs in a basaltic agglomerate. It lies on a buff tuff and is overlain by basaltic flows. The lower contact is marked by a change in soil and a break (lessening) in slope.



The lowest cut shows the best mineralization. The mineralization above this elevation is poorer and probably of no commercial importance. The depth of mineralization can not be told but extends probably no lower than the contact with the tuff, some 40' or less below this cut. The cut shows a depth of some 8-10' of enrichment. The northward extent of the mineralized agglomerate is some 600'—i.e. as far as the ridge continues northward before turning eastward into the main ridge front.

The total thickness of the basaltic agglomerate is several hundred feet. The rock forms rock pinnacles + columns. It is the lower portion only of this thickness that is mineralized.

Basaltic flows dip few degrees to NE.

3½' X 6" X 1" sample cut from E face of lowest open cut. Mineralization decreases toward bottom of cut but as it is not uniform it may again pick up at depth. Some of the mineralization is related to fractured zones. The sample is a fairly one. Better mineralization is shown in the rock piled up and taken from the cut.

The basaltic agglomerate extends some 1200' to the S but no outcrops of the mineralized horizon were seen. The rock of apparently higher horizons shows slight mineralization.

SE corner Sec 34 T 36S R2E El. 2400

T-24 Buff tuff breccia

E ¼ Sec 34

T-25 Samples from basaltic flows above agg. Fragment of basaltic agglomerate below more fluid flow rocks. Shows slight manganese mineralization

SE ¼ Sec 27 El. 2100

T-26 Brown tuff breccia samples

SW-¼ Sec 27 El. 2000'±

T-27 Dk gray fine grained basalt

T-28 Brown tuff breccia underlying the above basalt

A repetition of sequence plus physiographic breaks places a fault (?) between these last two localities.

SW ¼ Sec 34 T 36S R 2E El 2000'

T-29 Porphyritic andesite (?) Compare with T-13

NW ¼ Sec 10 T 37S R 2E El 2200'

T-30 Basaltic agglomerate (scoriaceous) with manganese mineralization

T-31 Tuff breccia (Knud?) underlying T-30+ with little manganese oxides

SW ¼ Sec 10 T 37S R 2E El 2200'+

T-32 Dk gray fine grained basalt with possible Mn oxides - may be primary mineral

T-33 White tuff breccia Compare with T-24

SW ¼ NW ¼ Sec 10 T 37S R 2E El. 2000'

T-34 Brown tuff or flow rock

T-35 Basalt Compare with T-29 + T-13

Aug. 12, 1942
Clear, hot

Near center Sec. 9 T 37S R 2E El. 2300'

A long abandoned prospect was the only workings found in the vicinity where Buck prospect - No. 7 Wells Medford Sheet - is shown. The rock here is a dark gray fine grained basalt. No manganese mineralization (outside that of ordinary basalt) was seen.

Near center Sec 8 T 37S R 2E El 2550'

Fox prospect No. 8 Wells Medford Sheet

No manganese mineralization of importance was shown in either the capping platy basalt or underlying scoriaceous material. A porphyritic basalt is associated with these rocks

---

No. T-36 Gray basalt
T-37 Scoriaceous basalt
T-38 Porphyritic basalt

These rocks are badly weathered as compared with the nearly horizontal flow rocks E of Tyrrell & Peck prospects. The attitude here is often steeply inclined though nearly flat lying attitudes are present. It is often platy & the porphyritic basalt of this area is platy - platiness believed produced by compression. The strike of the tilted beds is about N-S though close folding into basins & domes (undulatory axis) makes this less well defined.

These rocks are believed older than the tuff breccias & basalts found east of Lost Cr. Though some of the basalts on the E slope of this ridge

may be of equal age, it is not known + will be hard to prove. Proof of an older age will be looked for in the section between here + Lake Cr. and if the brown tuff breccia found on the E bank of Lost Cr. occurs in this section, then placing of fault along Lost Cr. may be justified. If not found, Lost Cr. may be a contact valley - between older basalts + overlying brown tuff breccia. Altho at one spot along the E side of Lost Cr a dk gray, brown stained porphyritic basalt was believed to underlie the brown tuff breccia, it could not be proved as slumping may have moved this basalt to an apparently underlying position. The andesitic basalt here SW of Peaks may be of older age as not only degree of weathering but attitude of beds are similar to that of areas of the ridge W of the Tyrrell property.

T-39 Rock from Open Cut No. 5

July 29, '42 (8)
clear, warm

NW¼ SW¼ Sec 10 T 37 S R 2E (near No. 5 Index Map)
El. 2300'±

Here crop out scoriaceous basalt pillars or columns 20' or more in height. They are not overlain here by any material but short distances to S are probably capped by the dk gray fine grained basalt exposed there in the bull dozer cuts & on the surface. The columns are there probably scoriaceous flow rock. The lower contact is with tuff or a soil zone colored brown to reddish brown either by baking (oxidation) or by iron solutions from above, or by both. The mineralization is insignificant though evident in the tuff or soil at the lower contact. It is of probably of economic value above the contact and upwards for five feet. Above this it becomes decreasingly poorer. The manganese occurs scattered (hardly disseminated) throughout the scoriaceous basalt in irregular pockets & vesicle fillings & crack & seam fillings. The main mineral is pyrolusite, probably after manganite. Vug-like pockets of it show a botryoidal-like inner surface. The botryoids are made of radiating fiber or crystal aggregates. The mineralization

is quite uniform to a height of five feet above the lower contact. At this spot

CG-560

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

ASSAY REPORT

Grants Pass, Oregon
Baker, Oregon

August 21, 1942

Sample submitted by Wallace D. Lowry, State Dept., Portland, Oregon

Sample description: _____

The assay results recorded below are made without charge as provided by Chapter 176, Section 10, Oregon Laws 1937, the sender having complied with the provisions thereof.

NOTICE: The assay results recorded below are from a sample furnished by the above named person. This Department had no part in the taking of the sample and assumes no responsibility, other than the accuracy of the assay of the material as furnished it by the sender.

	GOLD		SILVER		(Mn) Manganese				
Sample Number	Ounces per ton	Value	Ounces per ton	Value	Percent	Value	Percent	Value	Total Value
					2.1				

Market Quotations:

Gold	$	per oz.
Silver	$	per oz.
	$	per lb.
	$	per lb.

STATE ASSAY LABORATORY

R. G. Barnett

Assayer

CG-542
543
544

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

ASSAY REPORT

Grants Pass, Oregon
Baker, Oregon

August 12, 1942

Sample submitted by Wallace Lowry, Lake Creek, Oregon

Sample description: Samples coned and quartered once before crushing to about 8 lbs. each.

The assay results recorded below are made without charge as provided by Chapter 176, Section 10, Oregon Laws 1937, the sender having complied with the provisions thereof.

NOTICE: The assay results recorded below are from a sample furnished by the above named person. This Department had no part in the taking of the sample and assumes no responsibility, other than the accuracy of the assay of the material as furnished it by the sender.

	GOLD		SILVER		(Mn) Manganese				
Sample Number	Ounces per ton	Value	Ounces per ton	Value	Percent	Value	Percent	Value	Total Value
					7.35 1.20 5.40				

Market Quotations:

Gold	$	per oz.
Silver	$	per oz.
	$	per lb.
	$	per lb.

STATE ASSAY LABORATORY

R. G. Bassett
Assayer

Tyrrell Manganese Mine

Jackson County

STATE ASSAY LABORATORY
802 East H Street
Grants Pass, Oregon

ASSAY REPORT

December 22, 1937

Mr. Earl M. 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 Oz./ton	Gold $/ton	Silver Oz./ton	Silver $/ton	Webber Mn	Webber 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						
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			

Results of check assays of Libbey samples by W. A. Markert, Iron River, Mich. placed here for comparison.

(signed) Albert A. Lewis
Assayer

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 occurrences 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 N½ of the NW¼ of the SW¼, 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 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 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 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 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.

OTHER EXPOSURES OF TUFF IN THE TYRRELL AREA.

South of the Tyrrell mine on the same hill are some outcrops of red tuff showing slight manganiferous metallization. The rock is dense and hard, showing only very low grade material.

At the N. W. Corner of the SE¼ of sec. 9, T. 37 S., R. 2 E., near the top of a flat ridge on the west side of Lost Creek, about three-quarters of a mile west of the Tyrrell mine, is an exposure of dense red tuff showing traces of manganese oxides. A shallow cut has been run into it a few feet.

About 2 miles south of the Bush ranch and about 100 yards south of the Grissom ranch house, near the center of sec. 21, T. 37 S., R. 2 E., is a basalt scarp, 5 to 10 feet thick, under which is a layer, at least 10 feet thick, of gray basaltic breccia, much altered and iron-stained, containing small cavities lined with soft manganese oxides. The longitudinal extent could not be determined, but it may extend a considerable distance. Sample marked #6 represents the upper 6 feet of the breccia. The elevation of the Grissom ranch house is about 2600 feet.

At and near the top of a broad flat-topped hill, about three-quarters of a mile a little south of west of the Grissom ranch house, in the S.E.¼ of sec. 20, T. 37 S., R. 2 E., a considerable area of red tuff is exposed at from 3000 to 3100 feet elevation. Most of it is without capping. Some exposures were barren of manganese oxides, but in others, where perhaps the tuff was less dense, manganese oxides were present in the same form as at the Tyrrell mine. Because of transportation difficulties, exploitation in this area would be difficult, but, in case of emergency, prospecting would be warranted.

No. 5 sample (No. 1962) was taken from the side of a shallow cut on the Rummels prospect at the top of the flat-topped hill.

REESE CREEK MANGANESE OCCURRENCES

Location: This area in Jackson County is about 6 miles north of Eagle Point and is reached by going 5 miles north from Eagle Point on the Crater Lake Highway, then east about 3 miles on the Butte Falls road. It lies between branches of Reese Creek on a broad, flat hill which may be reached by trail about three-quarters of a mile long east from the point where the California Oregon Power Co. transmission line crosses the Butte Falls road.

Geology: As in the Lake Creek area there are nearly horizontal flows of basalts and tuffs, with the tuffs, in places, impregnated with manganese oxides along thin seams or in vesicles.

Occurrences: On top of the flat hill mentioned above and near the center of sec. 7, T. 35 S., R. 1 E. two shallow holes have been sunk. The deeper of the two was full of water, but a thin layer of gray and purplish tuff about a foot thick shows manganese oxides in irregular seams and cavities. A small ore dump thrown out from this layer of tuff shows relatively good grade ore, perhaps from 15 to 20 per cent. manganese. The second hole, about 100 yards west of the first, shows a small amount of similar ore.

This ground was formerly held by location by J. S. Vestal. The latest location notice, dated Dec. 2, 1936, was signed by F. D. Hill, Carrie H. Hill, and Irwin Koenig.

About a quarter of a mile southeast of these holes on the Butte Falls road, some road excavation has exposed both gray and red tuff having a similar deposition of manganese oxides. A few places have

high grade spots about the size of a walnut with narrower irregular seams, but a large proportion of the exposure is barren or very low grade. Only the upper part of the tuff can be seen and is about 25 feet long by 3 or 4 feet thick. It is overlain by platy basalt. This exposure is about 1500 feet northeast of the Harold J. Smith mail box and about five-eighths of a mile east of the Wilfred Jack ranch house. The Pacific and Eastern Railroad is about one-half mile west of the Butte Falls road at this point.

SIMILAR OCCURRENCES REPORTED BY J. S. PARDEE IN U.S.G.S. BULLETIN 725-C.

On the NEWSTROM ranch, about 2 miles north of the Tyrell mine, there is an area of tuff, like that at the Tyrrell, showing, in places, a deposition of manganese oxides. Outcrops indicate an areal extent of about 1000 feet wide and a mile long. No considerable amount of material rich enough to be classed as ore is exposed.

The STAR F ranch of J. L. Farrar is about 5 miles north of the Tyrrell mine and about 3 miles northeast of the Lake Creek Post Office. The material here is classed as very low in manganese.

The GUS NICHOLS prospect is about 5 miles north of the Lake Creek Post Office on the slope north of Salt Creek. Soft black manganese oxides, regarded as wad, occurs in the lower part of a basalt capping and the upper part of the underlying tuff, but in uneconomic quantities.

The HOMESTAKE claim of [illegible]. C. Daly is about a mile west of the Nichols prospect. No ore is developed.

The SIERRA METALS CO. claims and the CRESWELL claims lie about 3 miles southwest of the Tyrrell mine. Similar manganiferous tuff is exposed. There are only a few shallow pits and no ore is developed.

A. O. BAILEY MANGANESE DEPOSIT.

Location: This occurrence is about 4 miles west of Central Point, Jackson County, in an air line, on Lane Creek, or the west fork of Willow Creek, in the SE¼, sec. 1, T. 37 S., R. 3 W., By road the distance is approximately 5 miles, traveling west from Central Point over a paved highway for 1.8 miles to the Old Stage Road and on this graveled road for 1.9 miles to A. O. Bailey's mail box, at which point the Bailey road turns off to the south. The distance to the Bailey house is about 1½ miles, but the manganese deposit is passed at about 1½ miles and lies to the east of the road. The ground is held by location.

Topography: Locally, the region is in the foothills of a more mountainous country lying west and south. The vegetation is rather thick, with small pines, firs and madrones common. The drainage is northward to the Rogue River.

Geology: Rock exposures show pre-Tertiary metamorphics and granitic intrusives.

Occurrence: The manganese occurs as oxides derived from rhodonite in a fracture zone in a siliceous, schistose, metamorphosed sediment. Three open-cuts, one above the other and representing a difference in elevation of about 100 feet, have been driven in this zone, apparently on a fault plane which represents the hanging wall side of the fracture zone. Near the hanging wall, there is considerable crushed material and gouge, containing limonitic staining and spots with more or less solid pieces of manganese oxides. This strongly crushed zone is two or three feet wide. On the footwall side of this, the fractured, blocky schist contains manganese oxides as thin layers on the fracture and

cleavage planes, and, less commonly, as solid pieces of hard oxide probably derived from rhodonite. This foot-wall manganese zone is about three or four feet wide at the top of the exposure, with a thin manganese staining extending farther out in to the footwall. Because of caving in the cuts, the strike and dip of the deposit could not be seen clearly, but the strike is probably S. 20 to 40 degrees W. with a dip of 50 to 70 degrees S. E.

One sample (#7) was taken of the best looking material of the hanging-wall section, representing a foot in width, in the lowest cut. A sample (#8) representing about 3 feet of the foot-wall section, was taken in the highest cut.

The highest cut shows a greater quantity of manganese oxide deposition in the schist and more solid pieces of hard oxides than the cuts lower down, but the lower cuts expose considerably less of the fracture zone than the highest cut.

Since the manganese oxides were probably derived from rhodonite, the oxidation would be expected to be superficial. As now indicated by the surface development, the quantity of desirable ore available would be small. The fracture zone extends to the south and should be further exposed by cuts and trenches in order to show the economic possibilities of the deposit.

PETERS MANGANESE DEPOSIT

Location: This occurrence, covered by location by W. H. Peters of Glendale, Oregon, in a fraction of a mining claim, 600 feet by 600 feet, is in the NW¼ of the NE¼, sec. 17, T. 39 S., R. 1 W. It is reached by road south from Talent, Jackson county, along Wagner Creek to just south of the junction of Arrastra creek, a distance of 5.2 miles from Talent; and then up the hillside west of the junction of Wagner and Arrastra creeks for about a half-mile. The elevation is about 2900 at about 400 feet above the junction of the creeks.

Topography: The area is hilly with fairly steep slopes and a thin soil covering. There is a moderately thick vegetation of second growth pines and firs, with scattered madrone trees and large pines. The underbrush is thick at the lower elevations. The drainage is to Wagner Creek and Bear Creek which flows northerly to the Rogue River.

Geology: The immediate locality shows old metamorphosed sediments with a schistose structure.

Occurrence: 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 developments. The north cut is in two benches and here expose the deposit in three sections. The lower cut shows the foot-wall section with a thickness of about 5 feet, and the top cut shows a hanging-wall 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 hanging wall 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 degrees E. and the dip is about 60 degrees N.W. There is a layer of soft, limonitic, quartz material, about 3 feet thick, along the footwall. At this 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. A sample (#9) of this material represents the quality of ore that might be sorted. 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.

THE GEORGE McALLISTER WAY CAMPBELL MANGANESE PROPERTY.

Location: This occurrence is in sec. 5 (probably), T. 36 S., R. 7 W., near the summit of the slope north of Shan Creek, approximately 12 miles in a straight line west of Grants Pass, Josephine county. The route to the property is by the Redwood Highway west of Grants Pass to the west end of the bridge across the Applegate river, then to the north on the Riverbank Road to the Griffen School, a total distance of 13.2 miles. From the school house the route is over a Forest Service trail, for the most part, northwesterly and then southwesterly, a distance of about 3½ miles to the property. Four mining claims make up the group and are named Manganese Mystery No. 1, No. 2, No. 3, and Manganese Mystery Extension.

Topography: This is a low mountain area near the top of the south slope between Shan and Pickett creeks, and is characterized by steep wooded slopes with rounded summits. At the upper elevations there are rock slides on the steepest slopes, but in most places there is a soil cover. The elevation of the claims is between 3000 and 3500 feet. The elevation of the Griffin School is about 1000 feet.

Geology: The locality is made up principally of granitic rocks, probably tonalite, as characterized by A. F. Mitchell. 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.

Occurrence: The deposit has been explored mainly for gold on the Manganese Mystery No. 1 claim where it has been 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 be a siliceous phase in the diorite,

represented 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 were 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 from 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 N. and dips steeply to the E.

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 (#10) of manganese stained porphyry over a thickness of 6 feet was taken in the face of the largest opencut. Hand sorted ore on the largest dump is represented by sample #11.

J. M. ELDER MANGANESE CLAIM

Location: This occurrence is south of Mungers Creek, Josephine county, in sec. 6, T. 39 S., R. 5 W., about 26 miles by road south of Grants Pass by way of Murphy, Provolt, and Williams along the west fork of Williams creek. The last three-quarters of a mile is over an old logging road.

Topography: The area is in the low foot hills, with slopes rising to high mountains to the south and southwest. The elevation of the deposit is about 1900 feet. A thin soil covers most of the rock exposures and supports a vegetation of second growth timber, madrones and underbrush.

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

Occurrence: The only opening in the deposit is an opencut about 10 feet long with a face about 8 feet 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 cobbed to show fairly large pieces of deep pink rhodonite, and several hundred pounds has been sold to collectors and lapidaries. The work done on the deposit has been 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.

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES.

STATE ASSAY LABORATORY.

802 East H Street
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	
			Oz./ton	$/ton	Oz./ton	$/ton
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

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 Jacksoncounties. 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 N½ of the NE ¼ of the SW¼, sec. 10, T. 37 S., R. 2 W., 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. H. 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 50 tons of crude ore in 24 hours was built. Operating intermittently, the mill produced about 800 tons of concentrates said to assay about 46.6% to 52.8% manganese, 11.1% to 14.5% iron, 0.09% to 0.209% 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 LostCreek 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 consit 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.

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 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 drriv east en into the red tuff about 30 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 800 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 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.

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514	11	17.31	0.01	0.35	Blank	

(signed) Albert A. Lewis

Assayer

T - 39

Microcrystalline groundmass

Feldspar Albite twinning

~~25°~~ 17° - 15°

~~13°~~ 13° - 23°

Pyroxene (clino) anhedral

Magnetite grains (anhedral)

Sphenulites

Slightly porphyritic

Iron oxides may occupy openings at higher levels

Texture of groundmass

Trachytic

Basalt

Texture Vesicular

Filling of openings

iron oxides, manganese oxides?

Most of fillings are ⊥ to trachytic structure

T-6

Texture — Cellular — tuffaceous

Cell outlines

irregular + rough

Rock — Scoria

Composition

1. Pore space 25% — elongated + aligned
2. laths of feldspar ≥ 2%

rough alignment of laths (trachyoid)

parallel to long axes of pores — varies to undirected

3. Pores often filled with opaque material
4. Feldspar phenocrysts .19mm blue γ γw ⊥ Opt. + 2V small Dispersion r > v (?) index ≥ balsam

Manganese oxides

Occurs as a solid ~~filler~~ or ppt. filling completely the pores + openings of the scoria — laths seen in manganese mass

~~Dispersion r > v~~

Laths of feldspar

Albite twin. 14° — 28° ; 10° — 31° ; 32° — 27° ;

Serial No. P-846

Field No. Pr-689

Amount of alteration — slight (staining of spinel grains fresh

Texture Porphyritic, trachytic

Composition 5% Phenocrysts

95% Groundmass — fine grained

Minerals

Phenocrysts

1.1mm .9mm 4% 1. Feldspar — subhedral to anhedral

Albite twinning

15°-16°;

1% 2. Magnetite — anhedral grains

<1% .8mm 3. Pyroxene — anhedral

a. Twinned clinopyroxene — Augite

2V large (moderately)

dispersion $v > r$ (?) weak

Opt. +

Small ext. $\perp$ direction = fast ray

b. Orthopyroxene (?) $\parallel$ extinction

2V large believed opt. +

OVER

Groundmass

1. Laths of feldspar 50°
2. ~~Micro-crypto.~~ ~~Cryptocrystalline~~ 45%

T-19

SE ¼ Sec 4 T 37S R2E

Tentative assignment - Eocene member of agglomerate fm. B. Falls
Wells brown tuff of Medford quadrangle

Megascopic description

Texture - Tuffaceous

Color - brown

Composition

Feldspar

2ndary silica

Calcite

Microscopic

Texture - tuffaceous

Composition

2-2.5 mm 4% 1. Feldspar

Fractured in every direction - anhedral

Albite twinning

14° - 4° ; 19° - 27° (28° - 10°) ;

10° - 7° ;

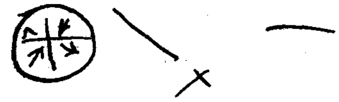
OVER

40% 2. Chalcedony - Irregular outlined masses of bordering areas of fiber-like (plumose) masses + inner spherulitic portions. Most masses lack spherulitic structure

45% 3. Groundmass - Devitrified brown glass

1% 4. Magnetite - subhedral to anhedral grains

<1% Corundum

Unknown Uniaxial # — 

1st ord. — low 2nd

Relief fair > feldspar

Zoned — no marked cleavage

~~Rutile?~~

Zircon? ~~too low bire.~~

~~Wernerite~~

~~Beryl~~

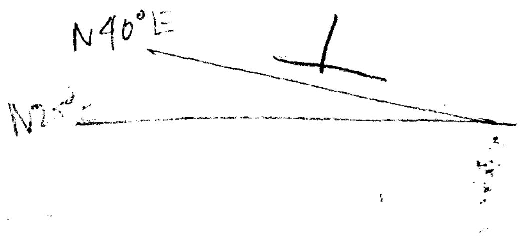
~~Apatite~~

100 wide
10 deep
1200

18 | 1200000

1800
60

100000 tons



.175
3000
225 0.00

1200' long × 200' wide × 6'

200,000
.07
14000.00

120000
12
240000
1440000
15 | 1440000
100000

27 | 1440000
53333
135
90
81
90
81
90
81

15 cu ft 1 ton

50000 cu yd

50 | 100,000 tons

100,000 tons
.102.5
.102500.
2500

T-23 SW¼ Sec 3 T 37 S R 2E

Tentative assignment — Eocene agglomerate fm of Butte Falls quadrangle — Wells buff tuff

Megascopic description

Texture — Agglomeratic — vesicular-scoriaceous

Color — Variegated — brown

Composition — lithic fragments
feldspar phenocrysts

Microscopic

~~Feldspar~~

~~Albite twin 14° - 30° can't be relied on~~

Texture

Composition

1.5mm 5% 1. Feldspar subhedral anhedra fractured
Albite twinning 28° - 26°
32° - 28°

3-8% 2. Magnetite subhedral to anhedral grains

Groundmass

3. Devitrified glass + magnetite grains
Index 1.535

4. Limonite stain

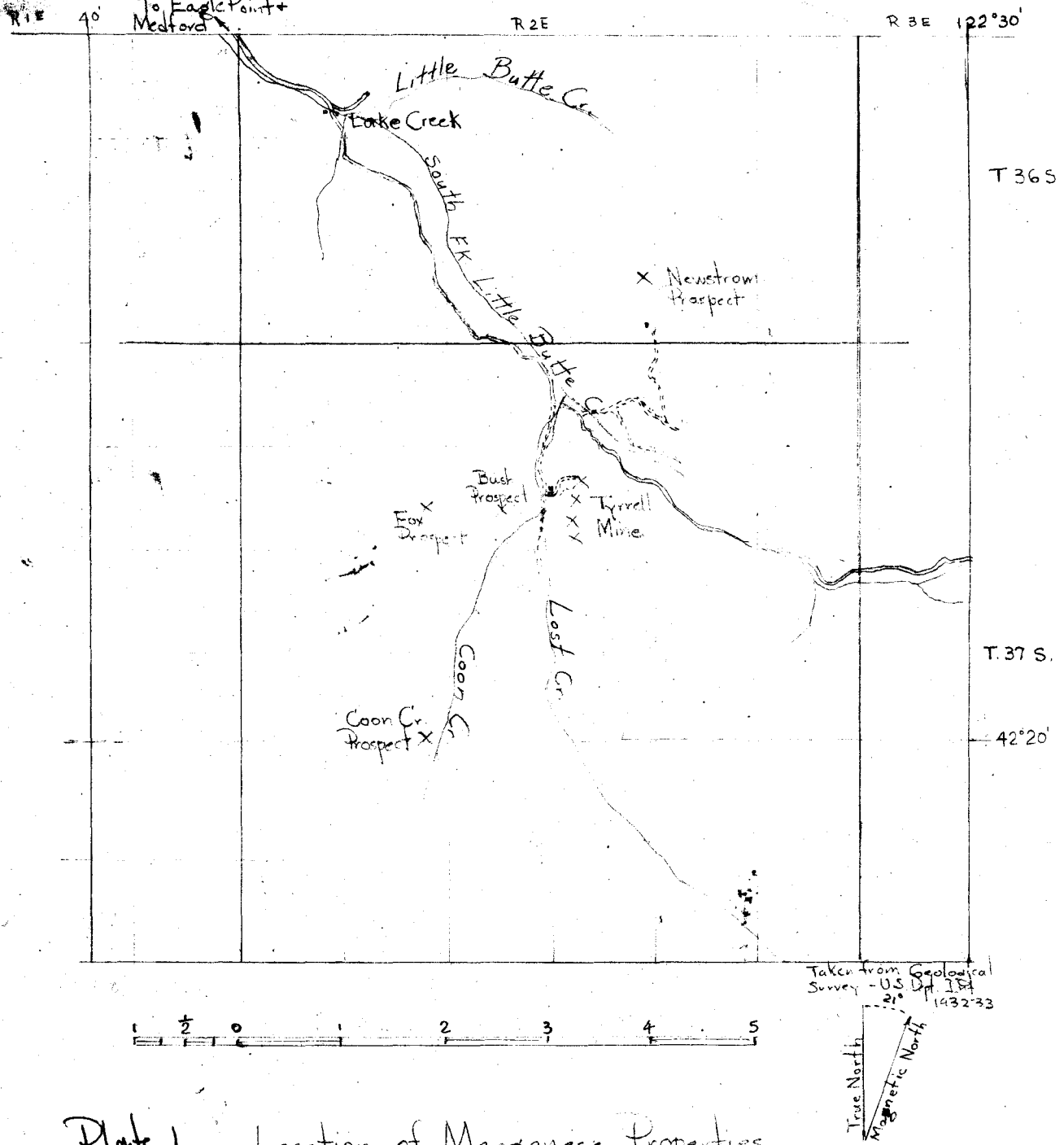


Plate 1. Location of Manganese Properties in the Lake Creek district, Oregon

Accessibility—

This district is 15 mi. ENE of Medford. From Medford it is reached by way of the Crater Lake Highway (Oregon 62) to Eagle Point (11 mi) thence east by improved road to Brownboro and Lake Creek (4 mi). The district is about 5 mi. SSE of Lake Creek. The Tyrrell Mine can be reached from there by dirt road, the last one mile being poor, esp. in the winter months.

Location of properties—

The properties (treated) in this report are shown on the location map, plate 1. They are:

Tyrrell Mine	Sec. 10, T 37 S, R 2 E	El. ca. 2300'
Newstrom Prospect	Sec. 34, T 36 S, R 2 E	El. ca. 2500'
Coon Cr. Prospect	Sec. 20, T 37 S R 2 E	El. ca. 3200'
Bush Prospect	Sec. 8, T 37 S R 2 E	El. ca. 2350'
Fox Prospect	Sec. 8, T 37 S R 2 E	El. ca. 2600'