

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

Head Office: 1069 State Office Building, Portland 1, Oregon

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N. S. Wagner, Field Geologist

239 S.E. "H" Street, Grants Pass
Harold D. Wolfe, Field Geologist

ORIGIN OF MANGANESE NODULES FOUND NEAR
HAMILTON, GRANT COUNTY, OREGON

By

F. W. Libbey and Norman S. Wagner

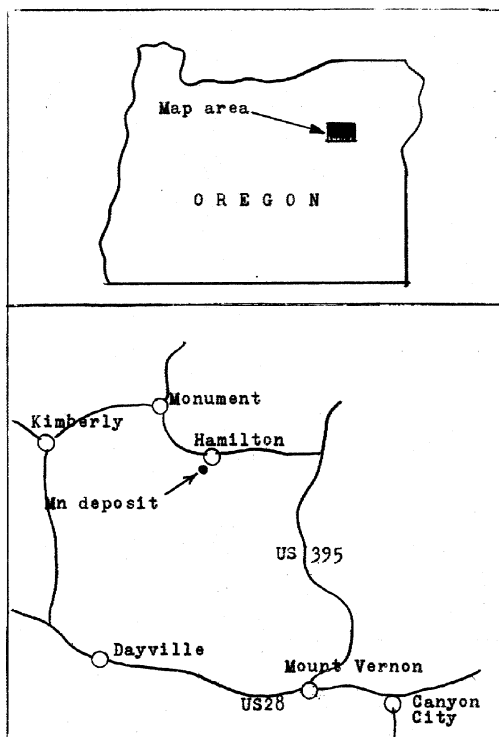
A manganese occurrence in northern Grant County, Oregon, was examined recently by the authors. Some characteristics of migrating mineral-bearing solutions are exemplified here and are of interest in showing how this particular deposit was formed. In this area (see index map) there are extensive exposures of brown and red volcanic tuff beds. These are probably of lower John Day age but the area has not been studied in sufficient detail to permit positive correlation and they may be upper Clarno instead. They have been deeply weathered.

At one place on a road about 1 mile southwest of Hamilton two adjoining cuts have been eroded showing steep faces from 20 to 40 feet in vertical dimension along a total length of about 500 feet. The tuff here is weathered to a bentonitic clay and at this place the weathering is considerably greater than at other tuff beds examined in the area. The manganese herein described is associated with this weathered tuff.

The steep faces of the cuts show furrowing and at the bottom of these furrows there are small gullies which dissect the talus that has accumulated at the base of the faces. The drainage is to a small dry creek bed which is the beginning of a branch of Fox Creek draining west into the North Fork of the John Day River at Monument. Accumulations of manganese oxide in a range of sizes from small particles to, rarely, nodules 2 inches or so in diameter are present at places in the creek bed, on the talus slopes, and even on the faces of the cuts. Viewed from a distance the manganese accumulations show up much better than at close range because of contrast in coloring between the manganese-covered areas and the manganese-free areas. On the steep faces this serves to outline a faint horizontal bedding.

It was originally assumed that the manganese nodules were disseminated in the tuff and that a large low-grade deposit might possibly be indicated, but some observations soon pointed to a different explanation for the occurrence. Digging disclosed that the manganese particles disappear at a depth of a few inches below the surface - at least in the places explored it is apparent that there is a far greater concentration of the manganese particles and pieces on the surface than immediately below the surface. This is true of the manganese on the cliff faces as well as that on the talus surfaces. Further evidence is that many of the small "hogbacks" separating the little gullies at the bottom of the faces are covered with a fair concentration of nodules while the gullies themselves have small concentrations. If the deposit contained disseminated nodules and particles, erosion would have concentrated them in the gullies. As an interesting sidelight, it was discovered that some moss growing at the bottom of one of the cuts was black. Examination under a

glass showed that the small tufted stems were covered with a coating of black metallic oxide. It is probable that the moss acts as a wick to draw up manganese solution from the tuff soil and concentrates it along with iron oxide on the surface of the moss by evaporation.



Index Map of Hamilton Manganese Occurrence, Grant County, Oregon.

All the evidence points to formation of the manganese oxides by surface phenomena. Dilute manganese solutions migrate to or near to the surface where evaporation in this semi-arid climate allows the manganese oxide to build up. Conditions which would allow the considerable variation in size of nodules are not easy to explain. It seems likely that the larger nodules must have been built up in a place which allowed ready access to the migrating solutions and at the same time was undisturbed by erosion of the tuff over a long period of time. As mentioned above, bedding in the tuff is in places emphasized from a distance by the coloration from the manganese oxide on the surface; otherwise the bedding is not distinct. This indicates that migration is facilitated in parts of the tuff at the expense of other parts.

The horizon of the tuff where the manganese nodules formed appears to be lower stratigraphically than other tuff beds seen between Hamilton and Monument 10 miles to the west.

The manganese nodules are principally impure psilomelane with some included tuff. A sample from the surface of a face of the out showing a good accumulation of nodules returned 18.85 percent Mn whereas a large sample of the tuff about 6 inches below the surface at the same place returned 0.1 percent Mn. The nodules contained about

31 percent Mn and 7 percent BaO. A sample of stems of the ashed moss gave 0.23 percent Mn.

It is reported* that a manganese deposit similar in petrology and origin occurs south of the Hay Creek Ranch near the road connecting Hay Creek and Grizzly and about midway between these places, in southeastern Jefferson County.

*Verbal communication from F. J. Rosenberg, mining engineer, Portland, Oregon.

OIL TEST NEAR ROSEBURG, DOUGLAS COUNTY, CHANGES HANDS

The Union Oil Company of California has purchased a controlling interest in Oil Developers, Inc., which has been drilling at the location in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 27, T. 25 S., R. 7 W., in Coles Valley about 20 miles northwest of Roseburg. The test, which was spudded September 20, 1951, had reached a depth of approximately 5,390 feet when the Union Oil Company took over on November 13. Drilling is being done by the Santa Maria Drilling Company of California. Mr. W. Layton Stanton, Jr., Union Oil Company geologist, is now in charge of the operation. Mr. Stanton supervised the Union Oil Company exploration at Ocean City, Washington, in the late 1940's.

DOMESTIC PRICE OF CHROME

The price of \$115 a ton for standard 48 percent chrome has been criticized as too high. Criticism is that, compared to the market price for imported chrome, the domestic price represents an unwarranted bonus and a burden on the American taxpayer.

It is not necessary here to emphasize the strategic nature of chrome or the advantage of having a domestic source of supply available in an emergency. It is, however, important to point out that the country needs chrome for the national stockpile as insurance for our national security, and that the stockpile is not being built up rapidly enough from imports. It is pertinent to point out also that the domestic price was established by experienced mining people representing the government after extensive hearings.

Let us make some comparisons between foreign and domestic prices for chrome.

When the Metals Reserve Company early in the World War II period was frantically seeking domestic production of chrome, a buying depot was set up at Grants Pass and a price schedule established. This schedule had a base price about half the price offered at present but the dollar was worth about twice what it is now worth. Further the Metals Reserve schedule was more liberal in that a percentage as low as 35 percent Cr_2O_3 was acceptable compared to a minimum of 42 percent in the present schedule. Another factor bearing on the present schedule is the matter of wages and the competition for mine labor from the booming lumber industry. At the time that Metals Reserve Company was buying chrome ore at Grants Pass the going miners' wage was \$1.00 an hour. Now the competitive wage is more than twice that amount.

The market price quoted for foreign chrome of metallurgical grade is \$43-\$45 for Indian and Rhodesian ore and \$52-\$54 for Turkish ore. (The reason for the variation is not clear since these prices are all based on 48 percent Cr_2O_3 and 3 to 1 chrome-iron ratio f.o.b. cars Atlantic Seaboard.)

Thus it appears upon first thought that the price of imported chrome is less than half that paid by the government for domestic chrome. But before this comparison may be intelligently made, certain questions need to be answered. What is the influence exerted by American metallurgical industries in keeping the price of imported chrome down? What is the influence of depreciated currencies on the price of imported chrome? How much money from ECA funds goes to the foreign producers of chrome as a bonus?

Numerous examples of ECA assistance could be cited. These represent direct grants and loans, such as the grant to New Caledonia, and indirect grants for purchase of mining equipment and supplies. Railroad facilities for the South African chromite fields, lack of which was formerly a serious obstacle to production, have been built through financial aid from the United States.

The American taxpayer is usually the loser in all such situations but if all these factors connected with buying of foreign chrome could be assessed accurately, it is likely that the government price for domestic chrome is not out of line even without considering the important advantage of spending the taxpayers' dollars at home.

F.W.L.

NEW LOCATION OF STATE DEPARTMENT

The State Department of Geology and Mineral Industries is now in its new offices on the tenth floor of the State Office Building at 1400 S.W. Fifth Avenue. The telephone number is Capitol 5561, Ext. 488.

OLIGOCENE SHALE IN ASTORIA, OREGON

Recent re-examination of foraminifera from Astoria, Oregon, which were first collected and studied in 1945, has called attention to one assemblage which suggests an upper Oligocene age rather than the Astoria Miocene age which the writers had previously assigned to it.

The main content of this assemblage includes Cyclammina, Martinottiella, Bathysiphon, and several other arenaceous genera, although a number of calcareous genera are also represented.

The shale sample from which these foraminifera were obtained was collected by Dr. E. M. Baldwin and R. E. Stewart in May 1945 from a roadcut along Commercial Street about 100 yards east of 37th Street. An automobile speedometer reading gave 1.6 miles as the distance between this locality and the intersection of 14th and Commercial Streets in Astoria.

Field notes taken by Dr. Baldwin describe this collecting locality as a high cut exposing about 50 feet of black rusty shale in which occur many small round concretions and some lens-like elongate concretions. Strike and dip readings of N. 55° E., 18° SE. were recorded.

An east-west trending syncline has been mapped¹ through Astoria, and the sample here believed to be of upper Oligocene age was taken from the northern flank of this structure where one might logically expect the exposed beds to be older than the Astoria Miocene beds found near the axis in the center of the city.

¹Weaver, C. E., Tertiary stratigraphy of western Washington and northwestern Oregon: Washington Univ. (Seattle) Pub. in Geology, vol. 4, pl. 8A, June 1937.

R. E. and K. C. S.

NEW ORE CONCENTRATING PLANT AT EAGLE POINT, JACKSON COUNTY

A concentrating plant for treatment of both chromite and manganese ores is being constructed about 1½ miles west of Eagle Point by the G.M.C. Mining and Milling Company. This company is composed of J. C. Larsen, George McKay, H. Harmes, James Bodenhamer, all of Sacramento, California, and Lester L. Sibley, Managing Engineer of Medford. The mill is expected to be in operation by December 15. The equipment will include an 18 x 30 jaw crusher, a 100-foot conveyor to transport ore from the crusher to a 200-ton ore bin, a large ball mill, Dorr classifier, three jigs, and eight concentrating tables. The mill will have a daily capacity of about 350 tons of ore.

The G.M.C. Company, which owns the Tyrrell manganese mine situated in the Lake Creek district east of Eagle Point, will obtain chromite ore from the Sordy chromite mine in the Briggs Creek area near Galice, Josephine County. The company is planning to accept custom ore in addition to the ore from its own properties.

CHROME MINERS HOLD MEETING

The Oregon Mining Association called a meeting of chrome miners on November 5, 1951. Mr. F. I. Bristol, President of the Association, reviewed conferences he had with government officials in Los Angeles at the American Mining Congress convention. Mr. Bristol expressed some optimism that maximum tonnage specifications which had been set up in the government chromite buying program might be removed or at least raised. It was the consensus at the meeting that much more chrome could be made available to the government stockpile from southern Oregon and northern California than had been previously estimated by government experts. It was also the consensus that the maximum specifications in the government program acted as a brake on achievement of maximum production.

BILL TO AMEND MINING LAWS

H.R. 4916 was introduced in the 82nd Congress and referred to the Committee on Interior and Insular Affairs where it remained until adjournment. This bill, copy of which is appended, apparently was prepared by the Bureau of Land Management and was designed to prevent filing of claims, principally on forest lands, by those whose principal interest is in timber rather than in mineral deposits.

The Act of July 31, 1947, establishes procedures available to the Secretary of the Interior for disposition of nonmetallics such as those listed in the bill and H.R. 4916 provides specifically that such disposition may not be made except under the procedures established by the Act of July 31, 1947. In other words, entry of such claims under the mining laws would not be legal. Presumably the bill will be re-introduced in the next session of Congress.

H. R. 4916

In the House of Representatives

July 23, 1951

Mr. Regan introduced the following bill;
which was referred to the Committee on Interior and Insular Affairs

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A B I L L

To amend the Act of July 31, 1947 (61 Stat. 681).

BE IT ENACTED BY THE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES OF AMERICA IN CONGRESS ASSEMBLED, That the following sections are hereby added to the Act:

"Sec. 5. Deposits of sand, stone, gravel, pumice, pumicite, and cinders when situated on public lands of the United States shall not be subject to acquisition under any other law.

"Sec. 6. The provisions of the Act insofar as it relates to the materials described in section 1 shall apply to lands in National forests and such materials when situated on national-forest lands may be disposed of by the Secretary of Agriculture pursuant to the terms, conditions, and limitations of the Act, as hereby amended. All moneys received from the disposal of materials by the Secretary of Agriculture under this Act shall be disposed of in the same manner as other receipts from the land from which the materials are disposed of."

BUFFALO MINE REACTIVATED

It is reported by the Baker Record Courier, issue of November 8, that R. G. Amidon will resume operations at the Buffalo mine, Grant County, Oregon, in the near future. According to this article the property was recently purchased from the Dennis estate by the Boaz Mining Company of Seattle, a newly formed company made up of a group including Mr. Amidon who will be in charge of operations. Gold is the principal metal produced.

LATEST REVENUE ACT

The Revenue Act of 1951 passed by the 82nd Congress late in the session and approved by the President October 20 contains provisions especially important to the mining industry. Some of these are as follows:

The capital gains rate has increased from 25% to 26%, effective January 1, 1952.

Excess profits tax base period income credit out back to 84% for all of 1951 income and to 83% for 1952 and later years.

Section 453(b), (2) and (4) of Excess Profits Tax law includes potash, sulphur and chemical and metallurgical grade limestone mines with coal and metal mines for exclusion from excess profits tax of one-half of the unit net income on all production in excess of average base period production. If mine was not in production, or was operated at an over-all loss during base period, one-third of its net income would be excluded from excess profits tax under this section.

Bauxite included as a strategic mineral exempt from excess profits tax.

Expenditures incurred in developing a mine after existence of ores or minerals in commercial quantities has been disclosed, are deductible in year incurred or, at election of taxpayer, may be deferred and charged off ratably against resulting ore or minerals.

Prospecting and exploration costs up to \$75,000 per year in any four years, prior to disclosure of a commercial deposit, may be charged off as expense, either currently or on a deferred basis.

Percentage depletion rate for coal is increased from 5 to 10 percent.

Percentage depletion at 15% granted to refractory clay, fire clay, chemical and metallurgical grade limestone, borax, Fuller's earth, tripoli, quartzite, diatomaceous earth, aplite and garnet; at 10% for asbestos, brucite, dolomite, calcium carbonate, magnesium carbonate (including magnesite), wollastonite and perlite; at 5% for sand, gravel, slate, stone (including pumice and scoria), brick and tile clay, shale, oyster shell, clam shell, granite, marble, sodium chloride and, if from brine wells, calcium chloride, magnesium chloride and bromine.

Capital gains treatment accorded to income received from coal royalties, with proviso that new provision will in no way change present tax treatment accorded royalties paid by lessee. (From American Mining Congress Legislative Bulletin No. 10, October 24, 1951.)

METAL PRICES

The E&MJ Metal and Mineral Markets, November 22, reports prices for nonferrous metals as follows:

Copper, $24\frac{1}{2}$ cents per pound, Connecticut Valley. Copper situation is extremely tight.

Lead, 19 cents per pound, New York. Mexican lead, $21\frac{1}{2}$ cents to 22 cents, f.a.s. Gulf ports.

Zinc, $19\frac{1}{2}$ cents per pound, East St. Louis. Mexican zinc for export, 30 cents to 31 cents, f.a.s. Gulf ports.

Tin, \$1.02 per pound.

Antimony, $50\frac{1}{2}$ cents per pound in bulk, f.o.b. producer's plant.

Quicksilver, \$215 to \$218 per flask.

Silver, foreign, 88 cents per ounce troy.

Aluminum, 19 cents per pound in ingots.

Nickel, $56\frac{1}{2}$ cents per pound, f.o.b. Port Colborne, Ontario.