RECONNAISSANCE RIDDLE DOUGLAS

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland 5, Oregon

Reconnaissance geology of secs. 18, 19, 30, and 31, T. 30 S., R. 6 W., and secs. 13, 23, 24, 25, 26, 35, and 36, T. 30 S., R. 7 W., Douglas County, Oregon

By

Hollis M. Dole and David J. White

ABSTRACT

A geologic reconnaissance of a twelve square mile area in the southwestern part of T. 30 S., R. 6 W., and the southeastern part of T. 30 S., R. 7 W., does not show anything that would indicate this to be a better prospecting area than areas of similar rocks found elsewhere in southwestern Oregon. The metavolcanic and serpentine rocks are recommended as the most likely sites of ore deposits but it is emphasized that intensive prospecting will be necessary to determine the economic possibilities of these areas. The present price of chromite and its insecure future suggests that immediate encouragement should be given for prospecting in the rocks in which this ore might occur.

The geologic map shows the distribution of the various formations found. The formations include both sedimentary and igneous rocks and range in age from late Mesozoic to early Tertiary.

GEOLOGY

Introduction

The area covered by this geologic reconnaissance consists of sedimentary and igneous rocks of the late Mesozoic and early Cenozoic periods. The surficial deposits of Quaternary age were not mapped and will not be discussed.

Igneous Rocks

Jurassic metavolcanics. All rocks in this category show some metamorphism and in most instances their original character is deciphered with difficulty. Probably most were originally flow rocks, as determined by their fine-grained character, and most are of an intermediate composition.

The more resistant rocks of this series form sharp cliffs and the less resistant have slopes covered with considerable rubble. Outcrops are numerous but due to jointing and metamorphism their structure is masked. Generally, these rocks trend NE with high dips to the SE. Their contact with the sediments of the Dothan formation appears to be conformable and for this reason they are thought to be of similar geologic age, that is, late Jurassic. The serpentine is intrusive into the metavolcanics and the contact of the metavolcanics with the Cretaceous sediments in the northwestern part of the area is marked by a series of faults.

Serpentine. Included in the areas mapped as serpentine is considerable peridotite but as it has been serpentinized to varying degrees no attempt was made to distinguish the serpentine from the serpentinized peridotite. Blocky outcrops in the area generally indicate peridotite. Zones of shearing within the serpentine are shown by a "backbone" or a "fish scale" type serpentine. These zones show lineation which undoubtedly is a result of the forces that produced the shearing. The lineation varies in strike from N 35° E to N 65° E and has steep dips to the NW or SE.

All contacts of the serpentine with the other formations show cross cutting relations. The serpentine has invaded the Dothan formation and the metavolcanics and is in fault contact with the younger sedimentary formations. From evidence found elsewhere the age of the serpentine is established as very latest Jurassic or early Cretaceous.

Dikes. Several dikes are noted on the map and float found in the field suggests that they are probably more common than indicated. The dikes are variable in composition, even over a short distance, but all have high percentages of feldspar; quartz was noted in some hand specimens but generally the rocks tend to be fairly basic. The dikes are intrusive into

the serpentine or are found in the volcanics a short distance from the serpentine. Their association in zones of shearing near the volcanics or near the sediments may indicate that they are the products of reaction between the sediments or volcanics and the serpentine or that they are the more mobile constituents of the invaded rocks which formed upon intrusion of the serpentine or upon faulting. However, a magmatic origin should not be disregarded.

Sedimentary Rocks

Dothan formation. The Dothan formation in this area is very similar to its type locality in Cow Creek Canyon, a short distance to the southwest. Graywackes and shales predominate; chert and conglomerate occur in minor quantities.

The general NE strike and high dip to the SE which is so common in the Dothan formation of the Dutchman Butte and Riddle quadrangles is still the dominant attitude in this area.

The age of the Dothan formation is late Jurassic.

Knoxville formation. A fairly large area of Knoxville age rocks is found at the eastern edge of the map area. This series continues eastward below Nickel Mountain and forms a fairly regular band that crosses the Umpqua River at the U. S. Highway 99 bridge just northwest of the town of Myrtle Creek. Small inliers of Knoxville conglomerate are found in the serpentine in the Beatty Creek area. From this evidence it appears that in this area the Knoxville formation has been engulfed by the serpentine. The contacts of the Knoxville formation with the Umpqua formation are faults.

The Knoxville formation is dominantly a pebble conglomerate. The pebbles are almost entirely of chert and are well rounded. Sphericity of

the pebbles is fair. Cementation is mainly silica. Jointing has sheared the pebbles so that a joint surface presents a very smooth face - cutting through pebbles and matrix with very little difference. The composition of the pebbles and the shearing are the main criteria for distinguishing this formation from the other sediments.

Little structure is evident in the Knoxville conglomerates and so their attitude is poorly known. Fossils found in similar-appearing rocks in the Dutchman Butte area indicate a very late Jurassic age for this formation.

A small patch of shale striking N 20° E and dipping 85° SE surrounded by serpentine was found in sec. 35, T. 30 S., R. 7 W. It is thought this shale belongs to the Knoxville formation.

Cretaceous undifferentiated. The rocks mapped as "Cretaceous undifferentiated" include the sedimentary rocks deposited during the Cretaceous period. No effort was made to distinguish the subdivisions of the period. These rocks are largely medium-grained sandstones but minor amounts of shale and conglomerate are found. Leaf impressions and invertebrate fossils are occasionally found but they are not common.

The structure of the sediments indicates two basins of deposition: one in Cow Creek Valley and the other in the upper Buck Creek and Thompson Creek area in the Dutchman Butte quadrangle. The contact between these rocks and the younger Umpqua formation is a sedimentary one but the contact with the older formations is faulted. Faults are common in the Cretaceous rocks but the strong jointing and slight metamorphism which marks the Knoxville and Dothan formations is lacking. In this respect, these rocks are more similar to the younger Eocene rocks than the older Jurassic rocks. This indicates that most of the severe orogenic movements and serpentine intrusion took place before these rocks were deposited.

Umpqua formation. The sedimentary rocks of Eocene age in this and the surrounding locality are termed the Umpqua formation. In the map area the Umpqua formation is largely massive boulder conglomerate but on the valley floor near Riddle, shale and sandstone predominate. The conglomerate forms bold cliffs and in Cow Creek it produces rapids.

In the cliffs above the Riddle "swimming hole" the rocks of the conglomerate have an average size of approximately 4 inches and a maximum size of 8-10 inches. The matrix, which makes up around 60 percent of the mass, is dominantly clay size material. The pebbles and boulders are mainly graywacke and metavolcanics. The strata of the cliffs in this area have a strike of N 45° E and a dip of 22° to the SE.

ECONOMICS

The serpentine, dikes, and metavolcanics are thought to be the only rocks which offer likely areas for prospecting. Many minor prospects have been found in all of these rocks but no known production to amount to anything has been recorded. Veins which contain minor amounts of gold and copper have been prospected in the metavolcanics and dikes. Disseminated chromite and small pods of chromite have been found in the serpentine. Minor amounts of asbestos were observed in the same rocks. Practically all drainages have been worked for placer gold but from the extent of the workings they do not appear to have been very productive.

For almost 100 years prospectors have been southwestern Oregon and it is unlikely that any large metallic mineral deposit outcropping at the surface would have escaped their attention. Inasmuch as no large deposits have been discovered in the area of this map it is assumed that if deposits

of value are to be found it will be the result of extensive prospecting or that minerals which have recently become of importance will be recognized.

Because of the present favorable price of chromite it is suggested that the areas of serpentine receive the greatest attention in prospecting, for it is only in ultrabasic rocks that lode chromite occurs. As there is no assurance that the Federal Government will continue to buy chromite at the present price after June 30, 1955, it would appear prudent to encourage prospecting.

During the course of this investigation nothing was found that indicated this area to be a better prospecting area than any other place in southwestern Oregon in which rocks of a similar character are found.

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland 5, Oregon

Report on investigation of the ultrabasic series that runs from Nickel Mountain to Little River (see Riddle and Roseburg folios).

On this investigation the ultrabasic masses locally known as Watson Mountain (secs. 33 & 34, T. 26 S., R. 3 W., and secs. 3, 4, 5, & 8, T. 27 S., R. 3 W.) and Red Mountain (secs. 9, 10, 16, 17, 20, & 21, T. 29 S., R. 5 W.) were traversed and the serpentine area south of Brushy Butte was visited. Samples of soil, peridotite and serpentine were taken and submitted for nickel analysis. This work was done June 16 and 18, 1951.

Watson Mountain

The soil at the summit of Watson Mountain is brownish red in color. Generally it has developed on serpentine and serpentine is found in it as residual boulders and as outcrops in place. Sometimes the serpentine areas are barren of vegetation. Most of Watson Mountain, however, is wooded. The soil in the wooded area generally is darker in color than the soil found in the barren area. This is probably due to organic material. At no place was a deep red soil found and logging roads, which run over the northern end of the mountain and make cuts several feet deep, expose none. Peridotite is found but is not as abundant as serpentine. The peridotite contains 10 to 15 percent enstatite, a minor amount of feldspar and abundant olivine. Along the Little River road typical slickensided serpentine is exposed over a distance of two to three miles. The hillsides to the north and east of Little River are barren and serpentine outcrops are common.

The mass of metagabbro that shows on the geologic map of the Roseburg Folio in the SW¼ of sec. 34, T. 26 S., R. 3 W., was identified as diorite in the field.

Summary

Although the summit of Watson Mountain is fairly flat and considerable soil is present, there was no garnierite found nor was a deep red soil apparent. Because of this it is thought that Watson Mountain is an unfavorable prospecting area for nickel laterite.

The following samples were taken:

Number	Location	Analytical results
LG-259 P-11325	T. 27 S., R. 3 W., sec. 4. Soil from serpentine area.	Ni: 0.23%
LG-260 P-11326	Peridotite from summit of Watson Mt. T. 27 S., R. 3 W., sec. 4	Ni: 0.25%
LG-261 P-11327	Serpentine from Little River Rd. T. 26 S., R. 3 W., sec. 34.	Ni: 0.28%

Red Mountain Area

A traverse was made through the ultrabasic area extending from the NE corner of sec. 3 over the summit area to the South Umpqua River in sec. 20, T. 29 S., R. 5 W. The ultrabasics were serpentine and peridotite. Generally the peridotite. Generally the peridotite contained 15 to 25 percent enstatite. Serpentine was the dominant rock from the summit of hill 2400 SW to the river and peridotite was dominant NE of hill 2400. Small flat areas two to three acres in extent are present in the ultrabasic area. The summits, however, are areas of outcrops with very minor soil.

Red soil was scattered over most of the area from the NW¼ of sec. 10 to the SE¼ of sec. 9 in the vicinity of hill 2780 (Red Mountain). Peridotite outcrops and boulders were numerous. (This area had less soil than found at Red Flat in the upper Pistol River area of Curry County.) Although the soil was definitely red it was not the deep red of Nickel Mountain and Red Flat. Probably the soil is several feet thick in many places. Two samples (LG-266 and LG-267) of soil were taken but it is thought that they were contaminated by organic matter and may not be representative.

The soil from the NE¼ of sec. 16 southwest to the South Umpqua River is generally dark in color and is not typical of the laterite developed on peridotite. No soil samples were taken. Serpentine is the dominant rock type of this area. One sample of saxonite (LG-270) was taken.

Acid dikes several feet across outcrop somewhat discontinuously from the summit of hill 2400 to the river. These rocks are mapped as dacite in the Roseburg Folio but hand specimens looked more like aplite. The rocks are fine grained, platy, have a pinkish tinge and a sugary texture. A specimen was taken for the museum (LG-271).

In the SW¼ of the NW¼ and just above the 1000 foot contour interval there were several small prospect pits in the serpentine and along one of the acid dikes. Chromite was piled on two of the dumps. There were only a few pounds in one pile and an estimated one to two tons in another. A sample (LG-272) was taken. Prospecting was minor but extended over 200 to 300 feet vertically and approximately ¼ of a mile laterally. Some of the prospecting was along and in the acid dikes. It is believed that the presence of chromite indicated this as being worthy of further prospecting; it is also believed that the original prospectors did not know what they were doing. This is all on private land.

Summary

Because of the easy accessibility of Red Mountain and the presence of a fairly widespread area of somewhat red soil, it is thought a few hand auger holes should be put down and samples taken, i.e. limited prospecting is warranted.

The presence of chromite should be recorded.

The area mapped as Myrtle by Diller has the appearance of the greywacke so common in the Dothan formation. One attitude was taken in bedded greywacke. It gave: strike - N 40 E, dip 60-70° NW. Diller records a dip to the southeast in this locality.

The following samples were taken:

Sample number	Location	Analytical results
LG-266 P-11332	Sec. 10, T. 29 S., R. 5 W. Soil sample.	Ni: 0.335%
LG-267 P-11333	Sec. 10, T. 29 S., R. 5 W. Soil sample.	Ni: 0.404%
LG-268 P-11334	Sec. 9, T. 29 S., R. 5 W. Peridotite.	Ni: 0.235%
LG-269 P-11335	Sec. 20, T. 29 S., R. 5 W. Serpentine.	Ni: 0.15%
LG-270 P-11336	Sec. 16, T. 29 S., R. 5 W. Saxonite	Ni: 0.217%
LG-271 P-11337	Sec. 21, T. 29 S., R. 5 W. Aplite dike.	(Nothing recorded museum specimen)
LG-272 P-11338	Sec. 21, T. 29 S., R. 5 W. Chromite.	Cr_2O_3: 51.89% Fe: 12.44

Serpentine south of Brushy Butte

The CopCo transmission line up Frozen Creek to the saddle in the ridge southwest of Brushy Butte was traversed to the contact with the serpentine. A sample of the serpentine was taken (LG-265) and a general reconnaissance of the area was made. No red soil was present and only minor peridotite was seen. The area is one of typical slickensided serpentine.

Number	Location	Analytical results
LG-265 P-11331	Sec. 29, T. 28 S., R. 4 W. Serpentine.	Ni: 0.28%

Report by: H. M. Dole

Reconnaissance by: H. M. Dole and L. Ramp

Date of investigation: June 16 & 18, 1951

Samples taken by Dole and Ramp in reconnaissance from 6-16-51 to 6-19-51.

Sample No.	Location T	R	Sec.	Area	Analyze for
#1 (6-16-51) LG-259	27S	3W	4	Watson Mt.	Spec. for Ni.
#2 (6-16-51) LG-260	27S	3W	4	Watson Mt.	Spec. for Ni.
#3 (6-16-51) LG-261	26S	3W	34	Little River Road	Spec. for Ni
#F1 (6-17-51) LG-262	30S	8W	26	Head waters of Union Cr.	Check for forams, etc.
#1 (6-18-51) LG-263	28S	5W	25	Dodson Mt.	Au, Nil Ag, Nil Cu, 0.05% Co? 0.001%
#2 (6-18-51) LG-264	28S	5W	25	Dodson Mt.	Au, nil Ag, nil Cu, 005% Ni=0.01%
#3 (6-18-51) LG-265	28S	4W	29	Dodson Mt.	Spec. for Ni
#4 (6-18-51) LG-266	29S	5W	10	Red Mt.	Spec. for Ni
#5 (6-18-51) LG-267	29S	5W	10	Red Mt.	Spec. for Ni
#6 (6-18-51) LG-268	29S	5W	9	Red Mt.	Spec. for Ni
#7 (6-18-51) LG-269	29S	5W	20	Red Mt.	Spec. for Ni
#8 (6-18-51) LG-270	29S	5W	16	Red Mt.	Spec. for Ni
#9 (6-18-51) LG-271	29S	5W	21	Red Mt.	Museum sample-dacite? also spec. ident.
#10 (6-18-51) LG-272	29S	5W	21	Red Mt.	Cr, Fe
#1 (6-19-51) LG-273	30S	6W	17	Nickel Mt.	Ni = 1.51%

results on previous page

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland 5, Oregon

Report on investigation of copper prospects in the Brushy Butte-Dodson Mountain area, Roseburg quadrangle, Douglas County.

This report is to supplement the investigation of January 14, 1951 made by F. W. Libbey and H. M. Dole. In the January investigation the prospect near the middle of the section line common to secs. 18 and 19, T. 28 S., R. 4 W., was visited. In this investigation the prospect in the NE¼ of sec. 25, T. 28 S., R. 5 W., was visited and the area of the prospects noted in the NW¼ of sec. 29 and the NE¼ of sec. 30, T. 28 S., R. 4 W., was explored. These prospects were not found. An attempt was made to find the prospect in the north central part of sec. 30 near the section line common to secs. 19 and 30, T. 28 S., R. 4 W., but failed. It is believed that the topographic map is incorrect in this area.

The prospect found was in the SW hillside approximately 30 feet above the west fork of the west fork of Frozen Creek. The tunnel was in massive diorite that had pyrite disseminated through it. The pyrite was plentiful not only in the walls of the drift but also in the diorite on either side of the drift. It occurs in cubes and irregular masses up to ¼ inch in diameter and shows very little oxidation. The diorite is somewhat platy as a result of joining. The main joint plane strikes N 60 E and dips 15° NE. There was no apparent reason for putting the drift where it was, i.e. there was no vein, fracture, or other indication of mineralization different from rock on either side of it. No copper staining was found. The tunnel was not mapped as it was deemed unsafe for entry. From the size of the dump it was estimated that it was approximately 150 feet long.

Investigation in the area of the other prospects indicated the following geologic relations for this region:

The lower Frozen Creek area is badly weathered granodiorite. Weathering has progressed to about the same stage as in the rock in the vicinity of Grants Pass. Several quarries are present and most of the local roads have been covered with material obtained from them. It is estimated that this intrusive outcrops over at least 4 square miles. Greywacke and shale of the same character that is found in the Dothan formation is found northwest of the granodiorite. One attitude showed the greywacke to be striking N 30 E and dipping S 70 E. The diorite in which the prospects are found is northwest of the greywacke. The diorite is a dark-colored, medium-grained, very tough rock. It is at least ½ mile wide. Whether or not it is a dike could not be determined but it is thought that it is. Northwest of the diorite, greywacke is sometimes found but generally the diorite is in contact with the serpentine-peridotite mass that trends from Nickel Mountain to Brushy Butte.

Summary

It is believed that the prospects of the upper Frozen Creek area are in a diorite dike that has been intruded along the margin of the ultrabasic mass and that they have no relation to the ultrabasic in regards to mineralization. No chalcopyrite or copper staining was noted in the diorite and so it is thought

that the copper content of the diorite is very low - if any. Further geologic work is not contemplated.

The following samples were taken:

Number	Location	Analytical results
LG-263 P-11329	Grab sample from portal of tunnel, NW¼, NE¼, sec. 25, T. 28 S., R. 5 W.	Ni - 0.01; Co - 0.001 Cu - 0.05; Au,Ag - nil
LG-264 P-11330	Grab sample from oxidized portion of dump of above tunnel.	Ni - 0.01; Au - nil Ag - trace

Report by: H. M. Dole

Investigation by: L. Ramp and H. M. Dole

Date of investigation: June 17, 1951