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PRELIMINARY REPORT ON THE
JONES-BOY SCOUT AND THE MOSS DRYDEN MOLYBDENUM
PROSPECTS NEAR HOLLISTER
NORTH CAROLINA

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Summary

The Jones-Boy Scout and Moss-Dryden molybdenite prospects are about 5 miles east of Hollister, Halifax County, in the northeastern part of North Carolina. Molybdenite, associated with pyrite, chalcopyrite, and sericite occur here in quartz veins 11 feet and more wide, in granite and schist, probably of pre-Cambrian age. Outcrops and molybdenite-bearing quartz float, which extend over an area at least 2 miles in its longest dimension, suggest that the veins have a wide distribution. One vein has a known length of 200 feet, but, in general, because of poor exposures, the length of the veins has not been determined. This preliminary study indicates that the veins in the granite, which most commonly trend northwest, are more highly mineralized than those in the schist, which dominantly trend northeast.

The veins have been prospected by trenches, pits, and, on the Jones-Boy Scout prospect, by a shaft 30 feet deep, but there has been no production from this area. Eight samples collected from the molybdenite-bearing quartz veins on the Jones-Boy Scout property, range from 0.3 to 1.00 percent molybdenite, and 2 samples from the Moss-Dryden prospects carry 0.20 and 1.15 percent molybdenite. No estimates of tonnage have been made because of insufficient data, but from the number of samples carrying upward of 0.5 percent molybdenite and the wide distribution of molybdenite-bearing veins and float it is recommended that additional prospecting be done on the Jones-Boy Scout property to determine the continuity of the veins and the grade of ore.

INTRODUCTION

The Jones-Boy Scout and Moss-Dryden molybdenum prospects are in Halifax County in the northeastern part of North Carolina. The prospects are about 5 miles east of the village of Hollister and about 1 $\frac{1}{4}$ miles west-northwest of Enfield on U. S. Highway 301. The Moss-Dryden prospect is about 1.8 miles by road south of the Jones-Boy Scout property.

Mr. Wilbur Burbank and the writer, accompanied by Mr. Southgate Jones, owner of part of the Jones-Boy Scout prospect, and Mr. Blackwelder, his foreman in charge of prospecting, spent one day, March 11, 1943, in a hasty reconnaissance of the molybdenum deposits, and the writer, assisted by R. J. Wright of the Geological Survey, made a preliminary study of these deposits from March 15 to 24, 1943. To determine the approximate grade and tonnage of ore present, a plane table survey was made of the prospects and 10 samples of ore were collected.

This study was made at the request of the War Production Board.

General Geology

The information regarding the general geologic setting of the area in which the molybdenum deposits occur has been obtained from Plate 1 of Bulletin 3 of the North Carolina Geological Survey. ^{1/}

^{1/} Nitze, Henry B. C., and Hanna, George B., Gold Deposits of North Carolina: North Carolina Geological Survey, Bull. 3, 1896.

The country rock in the vicinity of the molybdenum deposits consists of granite, schist and slate, all probably of pre-Cambrian age, which form an inlier in the western part of the Coastal Plain. Exposures are few and were

found only in the creeks, as shown on figs. 1 and 2, and in some of the pits and trenches. The exposures as well as float indicate that the ridges consist chiefly of granite whereas the surrounding relatively low areas are underlain in part at least by schist and slate mantled by younger sedimentary rocks of the Coastal Plain and alluvium.

The molybdenite is chiefly in quartz veins but a small amount is disseminated in the adjacent granite. The disseminated molybdenite that was observed is confined to a zone only a foot or two wide bordering molybdenite-bearing quartz veins, as is well shown east of the shaft on the Jones-Boy Scout prospect. Molybdenite is probably not widely disseminated through the granite anywhere in the area.

Associated with the molybdenite are pyrite, chalcopyrite, and sericite. The sulphides have been leached out of the quartz adjacent to cracks and fissures and from the surface to a depth of 1 to 2 feet, leaving a shell of bleached and relatively porous quartz. Molybdenum, as the yellowish molybdite, has been redeposited along cracks and seams, and secondary copper sulphides, probably both chalcocite and covellite, locally coat pyrite. The molybdite may locally enrich the ore, but is on so small a scale as to be of little economic significance.

The number and full extent of the quartz veins was not determined as outcrops along them are sparse excepting on two or three of the larger veins. However, float of quartz, though relatively abundant in the mapped areas is also present outside these areas, indicating that the veins have a relatively wide distribution. Outcrops and quartz float are more common ^{on} steep slopes where erosion has removed much fine debris than on the level areas, suggesting a greater abundance of veins throughout the area than would appear probable on the basis of their outcrops and the scant distribution of quartz boulders.

JONES-BOY SCOUT PROSPECT

Distribution of veins

The Jones-Boy Scout prospect (see fig. 1), has been explored by several pits, trenches, and a shallow shaft 30 feet deep, which reveal the presence of several quartz veins. The most continuous and also the most commercially promising of these, hereafter referred to as the Jones vein, is exposed, with both footwall and hanging wall showing, in a pit about 11 feet deep, 80 feet west of the shaft near the foot of the ridge. Here the vein is 11 feet wide, strikes N. 12° W. and dips 62° W. It has been traced up the hill to the south by means of several trenches and has a proven length of 200 feet. To the south of the 11-foot pit either the full width of the vein is not exposed or else it thins to 5 feet and less. Still farther southeast it either pinches out entirely or has been displaced by a fault. To the north of the pit the vein apparently ends abruptly for it does not outcrop along its projected strike in the creek only 50 feet away nor beyond the creek. It may have been cut off here also by a fault. The possibility that it may change its course, continuing as a vein exposed in the creek about 80 feet northeast of the pit is considered doubtful, as this vein, which strikes N. 10° E. and dips 60° W., clearly deviates from the normal course of the Jones vein.

Another vein, which will be referred to as the Crest vein, 5 feet and more in width and also of northwest trend, is intermittently exposed for 250 feet near the crest of the ridge. Boulders abundantly scattered along its projected strike suggest that it extends for another 100 feet to the southeast. The absence of outcrops along its strike to the northwest on the north slope of the ridge and the scarcity of quartz boulders here, not far from exposures which show the vein to be of large size, suggest that this vein does not extend to the northwest far beyond its last known outcrop.

The relation of the Crest vein to the Jones vein was not determined. A quartz vein, exposed in a shallow trench 330 feet southeast of the 11-foot pit, lies intermediate in position between the projected strike of the Jones and crest veins and suggests that these veins may have an en echelon or step-like relation or are fault segments of a former continuous vein. However, because of poor exposures their true nature and relations could not be determined.

Besides the Jones and Crest veins, several veins have been exposed in trenches on the north slope of the main ridge south of the creek and west of the Jones vein. None can be traced beyond the pits or trenches and, although they may be but short lens-shaped veins, it appears more probable that they continue for appreciable distances beneath the surface debris. From the abundant quartz float which literally covers the east slope of the ridge it seems reasonable to infer that a number of concealed veins are also present.

Evidence is less indicative of the presence of veins on the west slope of the ridge. A vein has been exposed on the south bank of the creek about 310 feet west of the 11-foot pit and another vein is exposed 120 feet south-southeast of the large building near the top of the ridge, and a local accumulation of boulders on the west side of this building suggests another vein here. However, both outcrops and float are less common here and suggest the presence of fewer veins on this side of the ridge than on the east side.

North of the creek a large barren quartz vein 4 feet and more wide, trending N. 12° E., dip not determined, is exposed near the western margin of the mapped area and a quartz vein is also exposed in a trench just above the creek near its bend. This vein is 36 feet long, strikes N. 65° E. and dips about 30° N. North of the creek also just east of the trail is a local

concentration of boulders suggesting a concealed quartz vein. Quartz boulders here suggest that other veins may be present but the relatively sparse distribution of boulders indicates that veins are less common here than to the south of the creek.

Quartz veins are also present north of the area mapped but the veins and quartz float observed in a hasty reconnaissance of that area were barren except for sparsely scattered flakes of molybdenite in one or two pieces of quartz.

Relation of mineralization to vein orientation

Apparently not all of the quartz veins carry molybdenite. This preliminary study suggests that those of northwest trend are the most commercially promising, whereas those of northeast trend are essentially barren. This study further suggests that most of the veins in the granite trend northwest whereas those in the schist north of the creek trend northeast or north-northeast, apparently in conformity with the schistosity. From these relations it is tentatively concluded that the veins in the granitic areas give greater promise of productivity than those in the areas of schist.

Grade of Ore

Eight samples from the locations shown on fig. 1 were collected from the most promising veins south of the creek. The analyses of these samples together with the thickness of the vein each represents are shown in the following table. Three samples represent different sections of the Jones vein in the pit where it is fully exposed from footwall to hanging wall, one represents the Jones vein exposed in the shallow trench 180 feet southeast of the pit, three represent veins and the mineralized granite in the

shaft, and one represents the quartz vein exposed in the shallow trench 120 feet east-southeast of the shaft. The analyses show that all the samples carry molybdenite in amounts from 0.5 to 1 percent, excepting the channel sample across the north wall of the shaft at its base which includes much granite and the sample from the trench northeast of the shaft which carry 0.30 percent.

Sample 4(a), (b), and (c) collectively represent a channel sample across the Jones vein, including about 18 inches of granite above the hanging wall, and give a weighted average of 0.83 percent molybdenite over a zone 12 feet wide. A channel sample of the Jones vein 2 feet wide taken from the trench 190 feet southeast from the pit shows the vein to carry 0.50 percent molybdenite. Samples 5 (a) and (b) and 7 represent material from the shaft; 5(a) represents a 8-inch vein at the bottom of the shaft; 5(b) is a channel sample across the north wall of the shaft and includes the 8-inch vein and some granite; and 7 is a grab sample from the dump which represents a quartz vein about 15 feet below the collar of the shaft. The vein at the bottom of the shaft and the grab sample show 0.90 and 0.63 percent molybdenite respectively, whereas the channel sample from the shaft carries only 0.30 percent. The grab sample represents a west-dipping vein. This vein and the 8-inch ^{vein} form a promising zone of veins about 100 feet east of the Jones vein. Two samples from the Jones vein and one from the 8-inch vein at the bottom of the shaft were also analyzed for copper and show appreciable (0.12, 0.13, and 0.09 percent respectively), though only minor, amounts of this metal

The Crest vein carries only scattered flakes of molybdenite and was not sampled. However, only the upper weathered portion is exposed and at least some of the molybdenite may have been leached out. The vein may show a more favorable grade in the unweathered portion.

Analyses (1) of molybdenite-bearing samples from the Jones-Boy Scout and Moss-Dryden prospects,
near Hollister, North Carolina.

Sample No.	Width of vein sample	<u>Jones-Boy Scout prospect</u>			Percent Cu (2)
		Percent Mo.	Percent Mo S ₂ (equiv.)	Percent Cu	
1	3 feet	0.19	0.32	n.d.	
4 (a)	5 feet	0.48	0.80	0.12	
4 (b)	4½ feet	0.59	0.98	0.13	
4 (c)	2½ feet	0.35	0.58	n.d.	
5 (a)	8 inches	0.55	0.92	0.09	
5 (b)	3-1/3 feet	0.19	0.32	n.d.	
6	2 feet	0.30	0.50	n.d.	
7	Grab sample from dump taken from 30-foot shaft.	0.38	0.63	n.d.	
<u>Moss-Dryden prospect</u>					
2	5½ feet	0.69	1.15	0.14	
3	Grab sample from dump at creek	0.12	0.20	n.d.	

(1) Cyrus Feldman, analyst, Geological Survey

(2) Not determined

Reserves

The small amount of exploration that has been done in the Jones-Boy Scout property leaves the extent of the molybdenum deposits still undetermined. The Jones vein is the only known potential reserve on the property. The total known length of the vein is about 200 feet but the width is uncertain. Where fully exposed in the pit it is about 11 feet wide, but it appears to be narrower in the trenches on the slope of the hill. None of the trenches, however, are deep enough to fully reveal its width. Assuming an average width of 8 feet, a length of 200 feet along the strike, and 12.5 cu. feet of ore to the ton, the vein would contain about 12,800 tons of molybdenite-bearing quartz per 100 feet of extent along the dip. No figures can be given with assurance regarding the other veins but it appears reasonable that enough of the other veins would be found to carry a similar grade of ore so that the reserve figures for the Jones vein could be doubled.

Conclusions

The preliminary investigation of the Jones-Boy Scout prospect has demonstrated the occurrence of several molybdenite-bearing quartz veins 11 feet and more wide and of a grade ranging from 0.3 to 1.00 percent molybdenite. Not all quartz veins carry molybdenite, but this preliminary study suggests that veins of northwest trend, which are dominant in the granite are most promising whereas veins of northeast trend, which apparently prevail in the schist north of the creek, are essentially barren. From these relations it is tentatively concluded that prospecting the veins in the granitic area offers greater promise of favorable results than in the schist area.

From the number of samples carrying upwards of 0.5 percent molybdenite and the wide extent of molybdenite-bearing quartz veins and float it is recommended that additional prospecting be done. Because of the apparent discontinuous character of the veins an adit drifted on the Jones vein and a crosscut about 100 to 150 feet from the portal would seem to be the best means of prospecting this area.

Moss-Dryden prospect
Distribution of veins

The Moss-Dryden prospect lies about 1.8 miles south of the Jones-Boy Scout prospect and has the same general geologic setting. The veins occur in granite, very probably the southward extension of the granite mass at the Jones-Boy Scout prospect. The granite at the Moss-Dryden prospect is intruded by a diabase dike.

Only one quartz vein is definitely known to occur here and will be referred to as the Dryden vein. It has been traced either by outcrops or by local concentration of quartz boulders along the approximate strike of the vein for about 1,600 feet. To the west it has been traced to the creek which forms the western margin of the mapped area. In a field west of the creek only widely scattered quartz boulders have been found and either the vein has pinched and only minor veins are present, or the vein lies buried underneath coastal plain sediments or alluvium. To the east the vein has been traced to a point south of the church (see fig. 2), east of which even boulders become widely scattered and are therefore not indicative of the eastward extension of this vein. Nevertheless, the low ridge of this area, the crest of which is formed by the quartz vein where exposed, continues eastward and indicates the possible eastward extension of this vein or others beyond the limits of the mapped area.

The trend of the Dryden vein is essentially easterly but the trend varies somewhat along its course. East of the diabase dike, which trends transversely to the vein, its strike is N. 76° E., whereas west of the dike its strike is essentially easterly and where it is well exposed in the creek along the west margin of the mapped area its strike is N. 75° W. Its dip, determined on the outcrop in the creek is 65° N. The Dryden vein has been prospected by shallow pits.

Two prospect pits have also been dug on the south bank of the creek about 450 feet west of the road but the presence of a vein here could not be verified as the pits are filled with water. It is reported ^{1/} that only molybdenite-

^{1/} Oral communication from Mr. Blackwelder, foreman in charge of prospecting for Mr. Jones.

bearing quartz boulders were present, although in the southeast corner of the eastern pit granite with a quartz veinlet is exposed. This, however, may be a large boulder embedded in the alluvium. No vein is exposed in the creek here but the abundance of molybdenite-bearing quartz on the dump, unlike the quartz from the Dryden vein 660 feet to the south, suggests that a quartz vein must be present close by.

Grade of ore

An examination of the Dryden vein shows it to be essentially barren of molybdenite excepting where it outcrops in the creek. Even in the pits, where the upper weathered material has been removed, the relatively fresh rock as well as the abundant float distributed along the course of the vein is essentially barren and only rarely are isolated flakes of molybdenite seen.

The Dryden vein where exposed in the creek is highly mineralized. A channel sample 5½ feet wide which represents the full width of the vein shows it to carry 1.15 percent molybdenite and 0.14 percent copper.

A grab sample was also collected from the dumps of the pits near the creek north of the Dryden vein. Although no barren quartz fragments were included in the sample, the analysis shows it to carry but 0.20 percent molybdenite.

Recommendation

The single known occurrence of molybdenite-bearing quartz of probable commercial grade shows the Moss-Dryden prospect to be too limited to be of economic interest and no further exploratory work is recommended there.

April 24, 1943.