

THE TUNGSTEN DEPOSITS ON M.Cs. 24 AND 25, CALLIE SOAK, MURCHISON G.F.

By R. S. Matheson, B.Sc.

GENERAL INFORMATION.

As a result of an application for financial assistance from the Mines Department a brief examination of these deposits was carried out on the 16th and 17th January, 1943.

The deposits are situated in the vicinity of Callie Soak, about 25 miles north-west of Cue and about 3¼ miles west of Telegootherra Trig. The deposits are about 11 miles north-west by road from the Big Bell Mine.

Some notes on tungsten deposits from the Callie Soak area are already contained in Bulletin 57* and the Mining Handbook.

According to the official production statistics 8.41 tons wolfram valued at £1,148 were recovered from 238.64 tons of ore, obtained from the area during the period 1910 to 1916. Calculations based on the price during the period of production, which was about 46s. per unit for 65 per cent. ore, shows that there is an error in the statistics, and they should read 8.41 tons of WO₃, not 8.41 tons of wolfram. Allowing for this correction it will be seen that the ore produced from this area, which was no doubt hand picked, averaged 3.52 per cent. WO₃.

GEOLOGY.

The area is composed mainly of porphyritic granite, which is intruded by a series of quartz and pegmatite veins. A few lenses of quartz-biotite rock, which may possibly be recrystallised remnants of pre-existing sediments, are also present. The complex is presumably of Pre-Cambrian age.

The principal tungsten mineral is wolframite (ferberite variety), but scheelite occurs, and is fairly abundant in two places. The tungsten minerals are everywhere associated with fractured, translucent, somewhat ironstained, quartz veins, and the quartz-biotite rock is frequently their host rock. Wolframite is not confined to the quartz, but also occurs in the quartz-biotite rock in proximity to quartz veinlets.

Cassiterite does not appear to be associated with the wolframite at this locality, but hematite pseudomorphs after magnetite are fairly common.

The soil in proximity to the lodes contains detrital wolframite, and is reported to be sufficiently rich, in a few places, to warrant working.

THE LODES.

The writer was concerned mainly with Martin's Lode and Bald Hill Lode, which are situated on M.Cs. 25 and 24 respectively, but a few smaller lodes occurring in the area were also inspected. The wolframite was readily detected by its marked physical characters but a "Mineralight" lamp was used to assist in the detection of scheelite.

The co-ordinates given below are referred to the plant accompanying Dr. Moss's report.

Martin's Lode (Co-ords. 1390S, 575E).

This is the only lode seen in the district, which has prospects of being worthy of large scale development. The financial assistance applied for is to prospect this lode.

The lode consists of a lens of quartz-biotite rock intruded by quartz veins and veinlets, which strikes N. 50° E. and probably dips vertically. It attains a height of about 15 feet above the general level of the surrounding country, and has a length of 265 feet and an average width of about 65 feet.

The two main quartz veins are barren, but a network of wolframite-bearing quartz veinlets occurs in the lens. The wolframite is not confined to the quartz veinlets, but was noted in the quartz-biotite rock in proximity to

them, in several places. Wolframite is most abundant along the south-eastern side of the lode, but it is also present on the north-western side. A small amount of scheelite, occurring in quartz, was detected by the "Mineralight" near the south-west end of lode, on the north-west side of the two well defined quartz veins. The reported occurrence of detrital wolframite on all sides of the lode supports the view that it has been mineralised erratically as a whole.

The existing workings consist of four shallow trenches; three on the south-eastern side of the lode and one on the north-western side. The trenches are short, and the longest extends only about half-way across the width of the lode.

The assay results from samples already taken from the lode give no indication of its average value, and this information can only be obtained by trenching and bulk sampling. A good indication of the economic value could be obtained, however, by bulk sampling the material mined from one trench across the centre of the lode.

Bald Hill Lode.

This lode is situated on a bare granite hill about 90 chains south-west of Martin's Lode.

A pegmatitic quartz vein, which strikes N. 20° W. and probably dips vertically, has been mined here over a length of 40 to 50 feet and to a depth of about 16 feet. The workings could not be examined due to the presence of water which stands at nine feet in the shaft. The vein appears to be about six feet wide and consists of a mixture of laminated quartz, felspar and mica, which is mineralised erratically with wolframite and scheelite. Wolframite frequently occurs as a core in the scheelite.* Most of the production from the Callie Soak areas has come from this deposit.

Detrital wolframite is present in the soil on the north-eastern side of the workings, and a fair amount of scheelite has been overlooked in the dumps.

This deposit has prospects of being quite a good small scale proposition.

Other Lodes.

Although these lodes have little bearing on this report it is advisable to record their presence.

A pegmatitic quartz vein containing wolframite and scheelite, which has prospects similar to the Bald Hill Lode, is situated about 22 chains west of Martin's Lode (at Co-ords. 1440S, 880W). The vein is lenticular, and strikes N. 50° W. and probably dips vertically. It outcrops over a length of 90 feet and has a maximum width of about 10 feet. Mineralisation has apparently been erratic, and the workings consist of a few potholes and one shaft, which has been sunk to a depth of 20 feet on a small fairly rich shoot. A fair amount of scheelite, and wolframite within scheelite, was noted in the dumps near the shaft. Scheelite is not abundant in the walls of the underground workings, and the floor of the workings, which is the most likely place for its occurrence, was covered at the time of inspection. A little molybdenite is scattered through this quartz vein.

Another scheelite and molybdenite bearing quartz vein has been opened up in a shallow trench, the co-ordinates of which are 200S, 820W. The vein is only a few inches wide however, and does not warrant much attention.

Wolframite-bearing quartz veinlets are associated with most of the small lenses of quartz-biotite rock shown on Dr. Moss's plan, but the mineralisation does not appear to have been extensive.

SUMMARY AND CONCLUSIONS.

The tungsten deposits in the Callie Soak area consist of wolframite and scheelite bearing, pegmatitic quartz veins, which are intruded into a complex of porphyritic granite and scattered lenses of quartz-biotite rock. In some deposits wolframite is the most abundant tungsten mineral, while in others scheelite predominates. The wolframite deposits are generally associated with quartz veinlets intruding lenses of quartz-biotite rock, and mineralisation of the host rock as well as the quartz

* Woodward, H. P., G.S.W.A. Bull. No. 57 (1918), pp. 53-54. Maitland, A. G., G.S.W.A. Mining Handbook (1919), Chap. II., Part III., Section 6.

† See specimen No. 2/2578, Geological Survey Collection.

‡ For report and plan refer to Mines Dept. File 1166/42.

* See specimen No. 2/2579, Geological Survey Collection.

was noted in several places. Only very small amounts of scheelite occur in these deposits. The scheelite deposits are associated with quartz veins intruding granite and a fair amount of wolframite is generally present. In these deposits mineralisation appears to have been confined to the quartz.

A few of the deposits warrant prospecting, but only one of them (Martin's Lode) has prospects of being worthy of large scale development. This lode consists of a lens of quartz-biotite rock, about 265 feet long and 65 feet average width, which has been intruded by a network of wolframite-bearing veinlets. Mineralisation has been rather erratic, but there is reason to believe that the WO_3 content of the lens as a whole, or a large part of it, may be sufficient to warrant large scale development.

A fair amount of trenching and bulk sampling would be required to determine the average value of the lode, and this would prove costly, but some indication of the economic value could be obtained by bulk sampling the material mined from one trench across the centre of the lode.

THE MOLYBDENITE DEPOSITS ON P.A.'s. 2323, AND 2324, MT. MULGINE.

Yalgoo Goldfield.

By R. S. Matheson, B.Sc.

General Information.

Mt. Mulgine is situated about seven miles south south-west of Warriedar, and about 55 miles east of the railway at Perenjori.

About 78 tons of Molybdenite ore valued at £865¹ were mined from shallow workings at this centre during the period 1917 to 1922, the price of molybdenite at the time being about £5 per unit for 90 per cent. concentrates. No production has been recorded since 1922, and this has been attributed to low prices. An increasing demand for molybdenite in the last few years has led to renewed interest in the deposits, and the price (at January, 1943) has again risen to £5 per unit. Since 1938 examinations of the deposits have been made by representatives of the Big Bell Mines, Ltd., and the Broken Hill Pty. Co. Ltd., and also by Dr. F. A. Moss, who holds one of the existing prospecting areas.

The writer's inspection was made during the period 13th to 15th January, 1943, as a result of an application² to the Mines Department for financial assistance to prospect the deposits.

Geology.

The writer's investigations were of necessity confined to a small area in the vicinity of the workings, but the general geology has already been described in departmental reports.³

Mt. Mulgine is a rough, isolated hill which attains a height of about 300 feet above the general level of the surrounding country. It is composed mainly of fresh, foliated, microcline-muscovite granite, which is intruded by a network of pegmatitic quartz and pegmatite veins. Narrow dolerite dykes, which have a general north-west strike, intrude this complex. The granite varies from fine to coarse grained, and its foliation planes strike in a north-westerly direction and dip almost vertically.

All the molybdenite occurrences are associated with the pegmatitic quartz veins, which generally strike in a north to north-west direction and dip vertically. The quartz veins are lenticular and vary in width from a stringer to about 12 inches. Although molybdenite is sometimes present in the quartz, it usually occurs as thin seams on the margins of the veins or as scattered flakes and rosette-like forms in the adjacent granitic wall rock. The marginal seams of molybdenite are erratic in occurrence, and the impregnation of the wall rock varies in width from a few inches to about two feet.

Wider zones of mineralisation occur where quartz veins intersect, or are parallel and in close proximity to one another. The molybdenite has been weathered out of the mineralised zones in places to depths up to two feet from the surface, but the nature of the vugs, together with occasional spots of molybdic ochre or residual flakes of molybdenite appear to give a fairly reliable indication of the existence of deposits.

Pyrite is a common constituent in the mineralised zones and fluorite was noted in one or two places, while the occasional presence of scheelite, magnetite, pyrrhotite, and manganese has been recorded. In the mineralised zones the molybdenite is reported to occur in close association with the mica, either interleaved with or completely replacing it.

The Workings.

The 14 trenches and adit referred to in Dr. Moss's report were examined by the writer, but in only five of the trenches and the adit were the prospects sufficiently encouraging for the deposits to warrant detailed examinations. The trenches are situated on the southern slope of Mt. Mulgine and the adit is at the head of a gully on its western side. Descriptions of these workings are given below, and the co-ordinates are referred to Plan No. 3 accompanying Dr. Moss's report.⁴

Trench A. (Co-ords 16—M, Western trench).

This trench strikes N. 13° W., is about 92 feet long, and it has a maximum depth of 12 feet. Mineralisation commences rather suddenly in the trench, about 48 feet from the north-west face, on a joint plane which strikes N. 60° W. and dips 65° N.E. Although the floor of the trench is covered, it seems likely that a molybdenite impregnated zone extended from the joint to the face, the average width being about six feet. The mineralised zone occurs between two quartz veins which are well exposed in the face. The eastern vein has an average width of about 12 inches and can be traced back to the joint, while the western vein only extends about half this distance, and diminishes in width from six inches in the face to a stringer. Quartz veinlets probably intruded the intervening granite, so that conditions were very favourable for mineralisation. No mineralisation appears to have occurred beyond the outer boundaries of the quartz veins.

The results of three samples taken from this trench by the Big Bell Mines Ltd. during the investigation are given below.

Sample.	Sample Width.	%MoS ₂ .
Horizontal sample from N.W. face	4 ft.	1.38
Vertical sample from east wall, 22 ft. from N.W. face	6 ft.	0.42
Horizontal sample edge of shallow hole (so called winze) on N.W. side of joint	6 ft.	1.01

Trench B. (Co-ords 17 to 18—L).

This trench swings from south-west to north, is about 36 feet long, and has a maximum depth of six feet at the north face. A 4 in. quartz vein, which strikes N.-S. and dips very steeply west, can be seen extending from the face into the eastern wall of the trench. The granitic country on both sides of the vein has been impregnated with molybdenite and pyrite, and the mineralised zone is exposed over a length of 20 feet over an average width of three feet. In this trench unweathered lode material is encountered at two inches from the surface. Indications of the mineralised zone were noted in the outcrops to 27 feet beyond the north face, but could be traced for only a few feet south of the trench.

An eight inch pegmatite vein, which strikes N. 65° W. and dips vertically, cuts through the trench near the north face, but its relationship to the quartz vein could not be established.

The north face was sampled over a width of nine feet by the Big Bell Mines Ltd., and it assayed 0.69% MoS₂.

⁴ For report and plan, see Mines File 1038/42.

¹ Maitland A.G., G.S.W.A. Bull. No. 89, p. 70.

² Refer to Mines Dept. File 1038/42.

³ Blatchford, T., Mines Dept. Ann Rept., 1918, pp. 77-78. Maitland A.G., G.S.W.A. Mining Handbook, Chap. II., Part III, Section VII.

see Maitland A.G. File 211/17.