

REPORT ON THE ROYAL GORDON WORKINGS,
VICINITY OF MOUNT GEORGE, BRANXHOLM.

Mount George is a low hill on the east side of the Ringarooma River, and one and a half miles south of the township of Branxholm.

Mine workings exist on its eastern, northern and western flanks while extensive alluvial tin workings of Ruby Flat lie immediately to the east. The workings on the eastern flank comprise that of the Royal Gordon face, a large and deep working in a soft granitic formation. On the northern flank there is a small working in soft granitic material at the head of the Blacksmith's Hit Gully. The workings on the western and north-western flanks includes the shafts and adit on the Eastman greisen lode; the Mt. George working in soft granitic formation, and a similar small working between the Briseis and Arba races.

At the present time the Siamese Tin Syndicate are engaged in prospecting around Mt. George by means of shafts and bore-holes to prove the extension of the soft granitic formation from the Royal Gordon face.

GEOLOGY

The summit and parts of the flanks of Mt. George are occupied by slates and quartzites, of which the latter are predominant. They have been weathered at the surface and trenches etc. reveal a reddish brown soil overlying fairly soft brownish quartzites. These rocks belong to the Mathinna series of Cambro-Ordovician age, common throughout the north-eastern Tasmania. They once covered the whole of the district before being removed by denudation to expose the granite which intruded them. Only a small covering probably not exceeding fifty to seventy feet in thickness now remains and in general the thickness will be less than the above figure, except where small roof pendants may project down into the granite.

The granite covers the greater part of the district and includes several different rock types most of which, however, have been associated with mineralization. The normal granite is a coarse-grained type with large white phenocrysts of felspar, the other constituents being quartz and biotite (black mica), the other types are even-medium grained granite, with muscovite or biotite partly altered, soft porphyritic granite and aplitic types. The medium grained types with muscovite and altered biotite and the aplitic type may represent separate intrusions prior to and associated with the mineralization, but the soft porphyritic type has been produced by alteration of the normal porphyritic type.

ECONOMIC GEOLOGY.

The sequence of events leading to the formation of tin deposits was intrusion of the granite magma and crystallization of the porphyritic granite; intrusion into the porphyritic granite of the magma yielding the fine medium grained types containing muscovite; and the intrusion of the residual vapours and or solutions which altered the porphyritic type and introduced narrow veins containing cassiterite formed the quartz greisen veins, and introduced the ore into the aplitic types, if it had not been included in them when they crystallized.

The mineralization does not as a rule extend into the overlying slates and sandstones, though in some cases nearly pure veins of cassiterite occur in the latter.

Several factors arise when the question of testing and working these deposits is considered, including the distribution of the tin ore in the soft granite, the cause of the softening of the granite, the extension of the deposit etc. which will be dealt with below.

DISTRIBUTION OF THE TIN ORE.

The greatest part of the Royal Gordon face consists of a soft porphyritic granite, which has been sluiced and yielded tin ore. Some but probably only a small proportion has been derived from quartz greisen, but the greater part has been obtained from the soft granite formation. The tin ore is occasionally seen by eye in form of narrow veins and irregular patches (possibly connected with veins). The recent testing work of Mr. Cox tends to prove that the formation does not contain tin ore throughout, but only when it includes the very narrow brownish veins.

At the southern end of the face soft fine-grained granite occurs and somewhat resembles an aplite, and this term will be used for it for descriptive purposes. This appears to carry the tin ore throughout its matrix to a greater extent than does the soft porphyritic granite.

SOFTNESS OF THE GRANITE FORMATION.

The softness of the formation has enabled the deposits to be sluiced and the tin ore recovered so that it is, perhaps, the most important economic factor. The softness has two possible causes, viz. that due to the mineralization and that to the superficial weathering.

The mineralization affects the granite in that the feldspars are usually attacked and altered to kaolin etc., which considered, reduced the hardness of the rock.

The weathering agencies have a similar effect in altering the feldspars to kaolin and rendering the rock soft. Any softness due to mineralization should extend to considerable depth, but that due to weathering should only extend to shallow depth (up to 50 or 100 feet).

Near the surface the softness is due to the superposition of that of weathering or that of mineralization, but it is difficult to determine without a detailed petrological examination where the effect of weathering ceases. This has an important bearing on the question of sluicing the deposits to depths of 100 feet or more. It might be assumed that boring would determine the depth of which the formation is soft enough to permit of sluicing, but this assumption is not altogether correct. Two recent boreholes below the bottom of the workings reached 27 and 30 feet respectively before the formation became too hard to bore, but passed through alternating hard and soft layers. It may be assumed from this that they passed below the depths reached by weathering; but that it is impossible to determine the depth to which the deposit could be sluiced, where softness due to mineralization only occurs, owing to the pressure of hard and soft bands in the formation.

The testing campaign is designed to prove the extension from the Royal Gordon face in a general north-westerly direction across Mount George and towards the valley of the Ringarooma River.

The Royal Gordon face occurs near the western end of a ~~pronounced~~ zone of tin-bearing deposits which trends in a general easterly or east-south-easterly direction towards Bell Hill. In a general way, therefore it is to be expected that the deposits would continue to the west or west-north west from the Royal Gordon face. As the summit of Mount George is occupied by sandstones, the deposit is not exposed at the surface, but ~~certain~~ workings and shafts on the north-western flanks prove the presence of soft granitic formation.

One extension appears to be through the old Mount George workings. Shafts E1 and E2 and an old shaft to the north-west show soft aplitic material at the western end. Shafts B2 and A1 and the small workings near the "A" line show soft granitic formation. Shafts C1, 2, & 4 show soft granite, and C2 soft aplitic formations. These areas cannot all be considered as forming one large area, although further testing might prove that some of them do connect with each other. Between the Briseis and Arba races the belt is narrow, and is more or less surrounded by hard unalterable granite.

Another extension appears to trend northerly and north-westerly from the Royal Gordon. Bores No. 7, 1, 2, 3 and 4 prove it for part of the distance, while the working at the head of the Blacksmith's Hit Gully proves that it extends as far as the Briseis race. The extension further northwest as marked on the attached plan was deduced from the outcrops along the Briseis and Arba races, but no testing has been carried out to verify this deduction.

It would appear from the above that the belt of soft granitic formation appears to split in two, the largest trending north-westerly and the other west-north-westerly. The latter is composed largely of aplitic material and possibly corresponds with that at the southern end of the Royal Gordon face.

There is no southerly extension of the deposit because a traverse of the Royal Gordon tail-race to the south and then the Briseis race north to the Mount George workings shows that a zone of medium-grained granite with partly altered mica occurs to the south of the soft formation, and is succeeded further south by hard, unaltered even-grained granite.

It must be pointed out that although sandstones occur on Mount George, they form a thin cover and that the granite and the soft formation will be found under them.

CONCLUSIONS AND RECOMMENDATIONS.

The extension of the soft formations from the Royal Gordon face are being tested with the object of possibly starting to sluice the deposits from the deep valley of the Ringarooma River.

Various aspects of the origin, extensions etc. of these deposits have been discussed above and the known areas of soft granite formations outlined approximately on the attached plan. This plan is only a sketch one but all workings, shafts, bore-holes etc. are shown approximately in their correct position, the water races and lease boundaries

having been used to compile the plan. A survey should be made of the district under review and a more accurate plan to be drawn to enable further testing to be carried out to advantage. Further testing by bore-holes and shafts should be carried to more accurately determine the outlines of soft granite and aplitic formations as shown on the plan. Lines and shallow shafts would probably be best and quickest to outline the areas while bore-holes could prove the extensions in depth and also in values. As regards the determination of values it must be realised that deposits of this nature are not uniform in value throughout, and that therefore it is difficult to properly determine the values by boring. The sinking of shafts with treatment of the whole of the material from each shaft would be most efficient, while sampling by cuts down the sides or ends of the shafts would probably be more satisfactory than boring. On the other hand, boring is much quicker and cheaper than shaft sinking to depth of 50 feet. A compromise has therefore to be made, and it is suggested that a certain number of shafts be used in determining the values of the formation.

The sides and bottoms of existing workings should also be systematically sampled.

It should be noted that as the deposits are primary ones the value should extend more or less vertically downwards to any depth likely to be reached by sluicing operations. This does not imply that the surface softness will extend to such depth, as it is impossible to forecast this feature which can only be proved by actual testing.

It is obvious therefore that further testing is necessary to outline the extensions of the soft granitic formations from the Royal Gordon Face and to determine the tin content of the formations.

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