

NOTES ON SPECIMENS OF TIN BEARING ORE FROM BLUE TIER, TASMANIA.

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A series of 12 specimens of tin bearing stone have been submitted for examination from Blue Tier Tasmania. They consist of granite in various stages of alteration to greisen. The granite is mostly a coarse grained type consisting of quartz, felspar and mica and the attack of the pneumatolytic vapour involves essentially the destruction of the felspar and the conversion of dark micas into white micas. This change is frequently accompanied by the production of topaz and occasionally of fluorite, and when the change is complete the rock becomes a greisen. The development of the greisen is often accompanied, but not always with the introduction of cassiterite. Following upon the pneumatolytic alteration some of the specimens suggest a later hydrothermal alteration which is indicated by the development of prosopite, a mineral similar to Kaolin in appearance, which results from the alteration of topaz. The activity of hydrothermal solution probably accounts for the extraction and disappearance of quartz from some of the specimens of greisen when a tin bearing product, consisting essentially of mica occurs.

The occurrence of the cassiterite is sporadic. In some specimens it is not observed and in others it is abundant and disseminated throughout the specimen. The size of the crystals is also variable and in some specimens the crystals are coarse and $\frac{1}{4}$ inch in width, while in others isolated crystals of cassiterite as small as .02 mm in width. Moreover large and small crystals may occur in the same specimen.

None of the specimens contain tourmaline, which is a mineral that frequently occurs in deposits of cassiterite.

The following are the details :-

Liberator Mine.

The sample, illustrating the Liberator Mine, is a coarse greyish granitic rock with particles of purple fluorite abundantly and evenly disseminated throughout the rock. It is comprised essentially of quartz, felspar and mica and abundant secondary fluorite and mica, and smaller amounts of topaz. Much of the felspar has been replaced by secondary mica, fluorite and topaz and in many cases the form of the felspar crystal is preserved even when the replacement is well advanced. No cassiterite is visible in the section or in the hand specimen.

Blue Tier.

Three specimens are labelled "Blue Tier". One retains the coarse granitic texture but the original granite is converted into greisen. The original felspar is completely replaced by secondary mica and quartz. The secondary mica belongs to the muscovite group though it is often tinged with a pale green colour. A few ragged crystals of topaz and a little fluorite occurs but cassiterite is very sparingly present.

A second sample from Blue Tier is also a greisen which is somewhat finer in grain and at the same time more micaceous. Topaz is abundant and scattered grains of cassiterite both large and small are present. The largest grains of cassiterite in a section measure .18 mm x .06 mm and the smallest .05mm x .03mm.

A third sample from Blue Tier consists essentially of pale mica. The abundant quartz in the typical greisen has been removed, leaving a mass of mica with occasional grains of quartz and topaz. Topaz shows extensive alteration to a material similar in appearance to Kaolin but in all probability identical with prosoopite ($\text{Ca}(\text{POH})_2$), $2\text{Al}(\text{POH})_2$) which is known as a hydrothermal alteration of topaz at Mt. Bischoff. Its development is probably simultaneous with the hydrothermal leaching of the silica from greisen.

Anchor Mine.

The specimens from the Anchor Mine include a reddish granite with only incipient greisenisation. The original feldspar of the granite is slightly kaolinised and partly converted into secondary mica and quartz. Biotite of the unaltered granite is partially preserved as green biotite and partially converted into iron stained aggregates which are sometimes accompanied by epidote or magnetite or occasionally pyrite. Small and scattered crystals of topaz also indicate the incipient development of greisen.

A tin bearing specimen from the Anchor Mine is a grey rock, retaining the coarse granitic texture. The development of greisen is well advanced and much of the feldspar has been converted into white mica and quartz. A small amount of fine granular epidote probably derived from the original biotite is recognisable. Topaz is more abundant than in the red specimen and a little fluorite is noticeable. Cassiterite is observed in grains as large as .8mm long by .4 mm wide and as small as .07mm by .08mm.

The third specimen from the Anchor Mine consists essentially of mica and topaz and probably represents a rock from which there has been a local hydrothermal leaching of the quartz in a more typical greisen. While most of the topaz is unaltered there is a noticeable development of the kaolin-like substance which is probably prosoopite between the cleavage planes of mica and cassiterite is sparingly developed.

Michael Mine

The least altered specimen and at the same time the poorest in tin, from the Michael Mine, is a rock, noticeably finer in grain than the typical granite. It contains a considerable amount of unreplaced feldspar though much of it has been partially converted into secondary mica and quartz. Topaz and fluorite are absent and grains of cassiterite are sparingly present.

A second specimen from the Michael Mine is a white crumbly rock, speckled with numerous crystals of cassiterite visible to the naked eye. The crumbly character is due to the abundance of kaolin or prosoopite, but the rock nevertheless retains some unaltered feldspar, quartz and topaz are also recognisable.

A third specimen from the Michael Mine is more compact than the preceding one, though it is at the same time relatively soft. It is rich in tin and contains coarse crystals of cassiterite, up to $\frac{1}{4}$ inch in width. The rock consists mainly of a yellowish scaly mica, while quartz and felspar are absent.

Australia Mine.

The least altered granite from the Australia Mine is somewhat crumbly as a result of the development of Kaoline or prosepote. Considerable felspar is preserved but very little topaz is recognisable as it has been largely converted into prosepote. Cassiterite may be sparingly distributed through the specimen but it is not present in a section.

A second specimen from the Australia Mine is a hard coarse grained greisen, consisting of quartz topaz and mica with scattered crystals of cassiterite. Topaz shows partial alteration to prosepote. The cassiterite, showing in section, ranges in size from $.1 \text{ mm} \times .9 \text{ mm}$ down to $.02 \text{ mm} \times .02 \text{ mm}$, though the larger crystals are more abundant.