OF THE TIN ORE DEPOSITS OF MOUNT BISCHOFF, TASMANIA.

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(Translated by Edgar Wolfhagen, M.B., Hobart, from the Special Imprint of the "Magazine of the Geological Society," 1886.*)

By the highly interesting description which M. Schroeder has given of the topaz deposits in the Schueckenstein and its surroundings, my attention was again drawn to the collection of specimens of minerals from Mount Bischoff, Tasmania, in the possession of the Royal Academy for Mineralogy in Clausthal. This collection has previously afforded me an opportunity for making a communication about a porphyritic topaz rock and about a peculiar topaz tourmaline deposit in the Tasmanian tin district.

According to M. Schroeder, the well-known topaz rock of the Schueckenstein (to which I have already referred in my description of the Tasmanian porphyritic topaz rock as an analogous formation) appears in a narrow topaz-bearing zone, "which extends almost at right angles to the limit of granite at the Laubach, and runs in an east-north-easterly direction across the Schueckenstein to the granite zone. It belongs to the outer zone of contact of the latter, or to its immediate neighbourhood."

M. Schroeder has shown conclusively that within this zone a transformation of the quartz-porphyry and tourmaline slate into topaz has taken place. He remarks that the topaz, thus transformed from quartz-porphyry, has a general resemblance to the Tasmanian topaz-rock described by me. The calcite, however, contained in the Tasmanian specimens is absent in the former, but it contains a certain amount of tourmaline. This difference in the accessory constituents does not seem to me to be of any great importance.

On account of the structure of the porphyric topaz rock described by me, which exactly resembles that of quaith-

* *The Mercury*, Hobart, Tuesday morning, Sept. 8th, 1885, contains a report of a meeting of the Royal Society of Tasmania, at which my work was discussed. To doubts which have been expressed as to the locality where the specimens which I examined were found, I must reply that Mr. Albert Wagenkuecht is my guarantee. He unpacked the cases, which he had brought from Australia, in my presence, and mentioned the localities where the specimens were found. The specimens are, at any rate, from Australia; very minute particulars, as to where they were found, are, for obvious reasons, not attached to them. It may be that the label, "Mount Bischoff," indicates the whole tin district of Tasmania (Waratah and Penguin mining district), in which this mountain is prominent on account of its rich mineral deposits.

porphyry in every respect, there can be no doubt that the Tasmanian rocks are also topaz-quartz-porphyry, more especially after M. Schroeder has made us acquainted with the topaz-quartz-porphyry of the Schueckenstein.

It appears, therefore, as if in the tin district of Tasmania (as in the Schueckenstein in the south-west of Saxony) a transformation of the rocks with topaz had taken place during the formation of the tin deposits. This is a previously unknown geological process of the highest interest, since it introduces new views as to the origin of the tin deposits. This process is probably not so isolated as would at present appear. The discovery made by M. Schroeder is the more interesting, as many pseudo-morphoses from topaz to other minerals are known, but no change of another mineral into topaz.

On the Schueckenstein the transformation with topaz occurs, according to M. Schroeder, by the topaz replacing both tourmaline and feldspar. Such pseudo-morphoses are not directly traceable in the Tasmanian specimens now before me; but in them pseudo-morphoses from quartz to topaz are evident. This must aid considerably in increasing our knowledge of the appearance of topaz. In a block of about 5 c.m. the inner portion consists of transparent crystalline quartz, with an admixture of dark grains of tin. Towards the outer portion of this block many irregularly-disposed columns or cryssals are seen. Only a few of these show the ordinary structure and form (∞ R., R. — R.) of ordinary quartz. The majority have a rough surface, are rounded at the angles, and are coloured pale-white. On breaking these crystals, as a rule, a perfectly transparent nucleus of quartz is seen, showing an uneven fracture. This nucleus is surrounded by a pale-white mass, which, on examination with a lens, appears partly homogeneous, partly delicately striated.

This mass is topaz, as is shown by an analysis made by Mr. Sommerlad. The material for this was not to be obtained absolutely pure, on acconnt of the small quantity at our disposal, and of the firm concretion of the topaz with quartz and microscopic grains of tin.

The analysis gave —

$Si.\ 0^2$	56·32
$Al.^2\ 0^3$	35·91
Fl.	10·68
Ca. 0	0·03
$Sn.\ 0^3$	2·42†
	105·36

†As during the principal analysis the exact amount of tin present was not ascertained, other specimens, as pure as possible, were selected for another analysis. These seem to have contained more microscopic tin grains than the first specimens.

By calculation is obtained—

29·93	$Al.^{2}\ 0^{3}$
17·46	$Si.\ 0^{2}$
3·18	Al.
11·02	Fl.
1·62	$Si.\ 0^{2}$
63·21	Topaz.
35·39	Quartz.
2·42	Tin.
0·03	Ca. 0.
101·05	Total.
—0·34	Fl.
= 100·71	

Just as the fine white topaz from Mount Bischoff, previously examined (c.f.r. this Journal, 1884, page 647), this topaz also contains some lime. According to Sandberger, its presence is caused by an incipient transformation from topaz to prosopit.

The topaz does not appear simply as a crust surrounding the quartz crystals, but as a pseudo-morphosis from them. In proof of this, the circumstance that the thickness of the topaz crust is always in inverse proportion to the diameter of the quartz nucleus (the entire crystals being of an even diameter of from 2-3 mm.) must be considered. In some crystals the topaz has entirely replaced the quartz; in others there appears a nucleus which, on breaking, is seen to be a very minute point. Between crystals of this form, and others only slightly surrounded by topaz, or wholly free from it, all transition stages are represented. It is remarkable that quartz crystals, partially transformed into topaz, have lost their distinct outline and smooth surface.

On transverse fracture of crystals containing larger quartz nuclei, it is seen that the topaz has advanced in a very irregular manner from without inwards. The crusts of topaz are not of uniform thickness; they protrude into the quartz in an angular manner. This is particularly well seen in thinly ground sections. The line of demarcation between topaz and quartz is quite irregular. The former contains, as is specially well seen under the microscope, small grains of quartz. Minute crystals of topaz protrude into the clear quartz in the form of needles, fibres, and bundles of fibres, or even lie, apparently isolated, in among the quartz. The quartz contains innumerable, irregularly distributed vacuoles, partly of an irregular, partly of an angular form. (Negative crystals).

The topaz is to be distinguished from the quartz by ordi-

nary light, by its dull colouration, and very finely granular or radiating fibrillar structure. This structure is still more beautifully seen by polarised light. The granular and fibrillar portions interlace in an irregular manner; the latter show very markedly an eccentric librillar structure, radiating from many points. This structure reminds one of that of sphaerulites. The appearance, on the whole, may be compared to that of ice crystals on a window, an appearance quite unusual for topaz.

Between the aggregate of topaz are seen isolated, generally small brown tin crystals, in width about 0·06 mm.; in length, 0·13 mm., rarely larger ones of a width of 0·04 mm. These crystals show twin formation and a zonular structure, this latter structure being evident on account of difference in colour.

To judge from one specimen among the collection, the pseudo morphoses which have been described appear to have taken place in clefts of a breccia of tourmalin, quarzit, and slate, of which several pieces are to hand.

The previously mentioned analogy between the formations of the Schueckenstein and its surroundings and these Tasmanian formations is considerably strengthened by the fact that this breccia, on the whole, corresponds to that in the Saxon formations described by M. Schroeder.

The specimens before me contain angular, chiefly flat, fragments of stone, about $2\frac{1}{2}$ c.m. in size. These consist of alternate layers of a light grey and brown, or greyish-green substance, of a thickness from that of paper to one of 5 mm. These layers are either straight or wavy. The light-grey strata show a finely granular, crystalline, shiny fracture; the more darkly-coloured strata, a more dense and duller fracture. From microscopic examination it is evident that these slate-like specimens contain only quartz and tourmaline; in the lighter strata there is more quartz, in the darker more tourmaline.

It is known that quartz appears sometimes in the form of a more or less finely granular aggregation. On treatment with Hydrofluoric acid only tourmaline remains, the quartz being dissolved. The tourmaline forms very minute needles, 0,02 m.m. broad, 0·13 m.m. long. These needles unite to form fibrillar or felt-like masses, or appear isolated in the quartz. Thoroughly formed or hemi-morphous crystals I have not been able to find. Not uncommonly, however, are seen among the needle-like and fibrillar forms characteristic, roundly triangular, transverse sections of tourmaline crystals.

By ordinary light the colour of tourmaline is chiefly brown, more rarely green, and most rarely blue. The pleochroism is very strong. A structure in which there is a difference in

colour between the nucleus and the crust is very common. In addition, the tourmaline is characterised by its insolubility in hydrofluoric acid and its intense reaction with beracic acid.

The binding material of the breccia consists of a crystalline and granular mixture of quartz and tourmaline. The quartz is concentrated in more or less extensive round patches of a white colour, and is finely granular. Here and there are also found isolated larger quartz crystals. The binding material contains many minute hollow spaces, the walls of which are covered by minute quartz crystals and hair-like tourmaline needles.

Attempts to find topaz in this breccia were productive of no definite result.

It remains undecided, therefore, whether the Tasmanian tourmaline-quarzit slate has undergone a transformation into topaz, as is the case in that of Saxony.

THE TROCHIDÆ AND OTHER GENERA OF MOLLUSCA FROM TASMANIA, WITH THEIR SYNONYMS.

Part I.

By John Brazier, F.L.S., C.M.Z.S., C.M. Royal Soc., Tasmania.

Having paid considerable attention to the Molluscan Fauna of Tasmania during the last 30 years, it is my intention, from time to time, to give to the Royal Society of Tasmania the benefit of my investigations. I now send my first paper on *Trochidæ* and other Genera of Mollusca :—

Part 1.—The coast of Tasmania is rich in *Trochidæ.* The Rev. Tenison-Woods appears to have done some good work in the recent species in his Census in the Proc. of the Society, 1877, published 1878. Some of the species are incorrectly identified, for instance, he quotes *Thalotia picta,* Wood. The *Thalotia* so quoted is a very narrow form of *Trochus* (*Thalotia*) *conicus,* Gray. The *Thalotia picta* of Tenison-Woods is the *Phasianella elegans* of Lamarck. Kiener, in his Coquilles Vivantes, having charge of Lamarck's collection, found out that it belonged to *Trochidæ*, and called it *Trochus elegans.* There being already in the genus Trochus, an *elegans,* Dr. Fischer named it *Trochus Lesueuri.* The *Thalotia mariæ,* Tenison-Woods, is the *Trochus pulcherrimus,* Gray, well