

*Note on some new localities for Gyrolite and Tobermorite.*

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SINCE the mineral gyrolite was described and analysed by Anderson from Storr in Skye in 1851, it has been recorded from a considerable number of other places in that island. The writer observed it at the mouth of the burn called Allt Mòr, between Loch Brittle and Loch Eynort, and has now to record it from Rudha nan Clach at the mouth of Loch Bracadale, which brings the number of localities at present known in Skye up to fourteen. In fact, the mineral may be said to occur all along the south-western shore, all along the eastern escarpment, and at the more isolated localities of Lyndale and Portree. Similarly, it occurs in the other trap islands—the Treshnish group, Mull, Muck<sup>1</sup>, Eigg, Canna, and Sanday, upon the last of which it has been observed by the writer at Stac nan Faoilean. In all, we have now some thirty localities in the Western Islands of Scotland; so that, although very seldom found in fine specimens, gyrolite may be said to be a characteristic mineral of the denser igneous rocks of the Hebrides.

It has not hitherto been recorded<sup>2</sup> from the mainland of Scotland; but the writer recently observed it in Argyllshire. The line of trap cliff, which stretches south from Ardtornish Bay in Morvern until it is cut off by the fault of the Dearg Allt, surmounts a steep talus overgrown with grass and clothed with bracken and low wood. There are few scree and the rock is much weathered and moss-covered. It is not markedly amygdaloidal, but occasionally analcime upon mesolite may be observed. In the harder and more basaltic rock the steam cavities are small and rare. When they do occur they are generally filled with gyrolite.

Very rarely the druses of the Ardtornish basalt are filled with reddish-white, massive tobermorite, apparently upon mesolite. The species tobermorite has also not been hitherto observed upon the mainland. It has been recorded by Heddle<sup>3</sup> from Tobermory and Bloody Bay in Mull

<sup>1</sup> M. F. Heddle, 'The Mineralogy of Scotland,' 1901, vol. ii, p. 98.

<sup>2</sup> A reported occurrence in Stirlingshire was shown by Lacroix to refer probably to thomsonite (Bull. Soc. franç. Min., 1887, vol. x, p. 148).

<sup>3</sup> 'The Mineralogy of Scotland,' 1901, vol. ii, p. 83.

and from Dunvegan in Skye. Sgùrr nam Boc in the latter island should also have been given<sup>1</sup>. On the other hand tobermorite with analcime is mentioned in 'The Mineralogy of Scotland' as associated with the gyrolite of Beinn na Croise in Mull by an error in the transcription of the MS., which has transferred these minerals from the locality immediately following. They really belong to Bloody Bay<sup>2</sup>.

The only other mineral in the rock at Ardfornish is yellowish-green olivine in small nodules of 3 to 4 mm. in diameter.

In every case, so far as the writer knows, the Scottish gyrolites occupy the infrequent druses of dense Tertiary basalts, and are generally solitary. The only common associate is the closely allied mineral apophyllite.

The mode of occurrence in Scotland does not lend any support to Professor How's supposition that gyrolite owes its origin to the decomposition of apophyllite. In fact when they occur together the apophyllite in Scotland seems invariably to overlie the gyrolite, as it does in California, so that in these cases it would be more reasonable to derive the former mineral from the latter. But in specimens freshly extracted from the rock both minerals appear perfectly unaltered, and there does not seem to be any ground whatever for the supposition that either is formed at the expense of the other. It is curious that if How's statement<sup>3</sup> be correct, the order of deposition in Nova Scotia is the reverse of that observed in Scotland, while in California we again have the gyrolite as the older mineral.

Gyrolite was some time ago recorded by Professor Heddle from the Færöes, his locality being Kodlen in Osteröe. It has been observed by the writer at three other localities, all of them in the island of Stromöe. These are the shore of Leinum Vatn (sometimes called Store Vatn); Vestmannhavn; and Sundelaget, at the narrowest part of the strait between the two principal islands.

At the last-named locality the gyrolite, here associated with small superimposed crystals of apophyllite in the combination *a c*, sometimes overlies a massive, white mineral with a minutely mamillated surface, which, so far as can be judged without analysis, is identical with tobermorite.

Professor Heddle<sup>4</sup> further identified with gyrolite the 'micaceous

<sup>1</sup> See Heddle, Trans. Geol. Soc. Glasgow, 1892, vol. ix, p. 254.

<sup>2</sup> Cf. 'The Mineralogy of Scotland,' 1901, vol. ii, p. 92.

<sup>3</sup> Edinburgh N. Phil. Journ., 1861, vol. xiv, p. 117.

<sup>4</sup> 'The Mineralogy of Scotland,' 1901, vol. ii, p. 79.

zeolite' of Giesecke from Niakornak, which of course is not upon Disco Island as stated by Haidinger, but upon the south shore of Umanak Fjord in Greenland. Giesecke in his diary<sup>1</sup> says that the 'faserigen Mesotyp . . . geht oft ins krummblätterige über, ist schiefrig, hat einen starken Perlenmutter-, oft beinahe metallischen (Silber-) Glanz, und braust etwas mit Salpetersäure [probably from calcite present as an impurity]. Seine Krystallisation scheint die sechsseitige Tafel zu sein.' Elsewhere he calls this mineral 'Glimmerzeolith,' and at Tupausarsuit<sup>2</sup> connects it with the accompanying apophyllite. Both minerals also occur at Tarajungitsok in Disco Fjord<sup>3</sup>. Perhaps gyrolite is also indicated by the 'massive apophyllite' and 'pearl-white radiated mesole' of Akkiarut<sup>4</sup>. Although they are really very distinct in appearance, it is by no means always easy to decide whether faröelite or gyrolite is intended by the 'mesole' of some of the older writers.

It is interesting to note that Sir Charles Giesecke records as accompanying the apophyllite and gyrolite of Tupausarsuit a 'pale red massive zeolite<sup>5</sup>,' which we may probably infer to be tobermorite.

<sup>1</sup> F. Johnstrup, 'Gieseckes mineralogiske Rejse i Grønland,' Kjøbenhavn, 1878, p. 245.

<sup>2</sup> loc. cit., p. 255.

<sup>3</sup> loc. cit., p. 329.

<sup>4</sup> C. L. Giesecke, 'A descriptive catalogue of a . . . collection of Minerals in the Museum of the Royal Dublin Society,' Dublin, 1832, pp. 54, 55.

<sup>5</sup> loc. cit. (Diary), p. 255.