On the occurrence of acmite in the riebeckite-microgranite of Mynydd Mawr, Caernarvonshire.

By S. R. Nockolds, B.Sc., Ph.D., F.G.S.

Department of Mineralogy and Petrology, University of Cambridge.

[Read November 4, 1937.]

THE existence of an unidentified mineral in the riebeckite-microgranite of Mynydd Mawr has been known for almost exactly fifty years. It was first noticed by Harker and described by him in the following words:[1] 'The ground-mass [of the microgranite] is a finely granular admixture of quartz and orthoclase, as in an ordinary "microgranite", but containing in addition another mineral which is often plentiful. It occurs in minute crystals of acicular or rectangular form, scattered through the ground-mass or included by the other constituents, and having usually a fluxional arrangement agreeing with that of the parallel hornblende and tourmaline streams. The mineral is colourless, or in the larger crystals gives for vibrations parallel to the long axis a faint tint of indigo-blue. The crystals give high polarisation colours and straight, or nearly straight, extinction. They have a high refractive index, which causes them to stand out in relief when viewed by ordinary transmitted light.'

Almost at the same time, Bonney read a paper before the Mineralogical Society on this same microgranite, in which this doubtful mineral is again mentioned:[2] 'In this ground-mass are numerous belonites, often about ·002″ long, almost colourless, but perhaps of a slight yellowish tint. It is difficult to make sure of their extinction angle, but it is certainly small, though sometimes appreciable. As the slide is rotated the mineral becomes of a rather bright golden colour. Probably it is a variety of hornblende.'

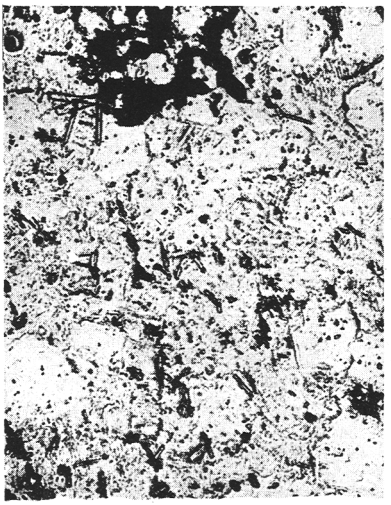
Just as Harker's paper appeared, and Bonney's was read, Sauer[3] described a new member of the amphibole group, riebeckite. In a later paper, Harker points out that the 'hornblende' and 'tourmaline' in the

[1] A. Harker, Geol. Mag., 1888, new ser., dec. 3, vol. 5, p. 225.

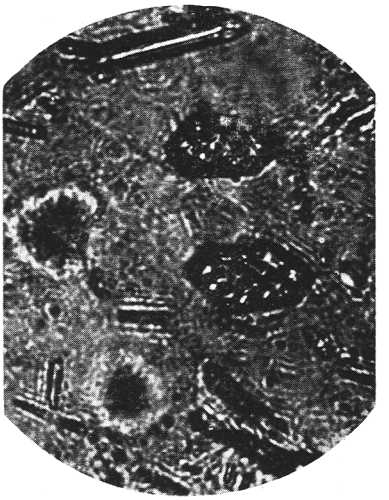
[2] T. G. Bonney, Min. Mag., 1888, vol. 8, p. 104.

[3] A. Sauer, Zeits. Deutsch. Geol. Gesell., 1888, vol. 40, 138–146.

Mynydd Mawr rock must be riebeckite. He again refers to the small crystals in the groundmass (loc. cit., p. 456): 'Besides the larger crystals of riebeckite, Sauer finds in the Socotra granite microlites of the same mineral, precisely similar to the colourless and pale-blue microlites already described in the rock of Mynydd Mawr.



1



2

FIG. 1. Thin section of the Mynydd Mawr microgranite showing some larger and numerous small acicular crystals of acmite. The black mineral is riebeckite. Ordinary light × 100.

FIG. 2. Two basal sections of acmite. The lower one is the better and shows the form (110) with (010) well developed and (100) very poorly developed. The upper one is also flattened on (010). Ordinary light × ca. 530.

It will have been noticed that Harker speaks of these small crystals as being colourless or pale blue, whilst Bonney describes them as almost colourless or having a slight yellowish tint. This is explained by the fact that the small crystals found in the groundmass belong to two different minerals. There are some small pale blue crystals of riebeckite and the greatly preponderating crystals of the unidentified mineral which are colourless or pale yellow. It is with these latter that we are concerned.

These colourless to pale yellow crystals have an average length of some 0·06 mm. Many are very much smaller, whilst some are larger, up to 0·30 mm. in length and 0·06 mm. in breadth. They usually show rather irre ular rounded terminations (fig. 1). Basal sections are

extremely rare in the thin sections examined, but two are illustrated (fig. 2). The form of these basal sections is that of a pyroxene and the prismatic cleavages intersect at an angle of approximately 88°. The crystals show little pleochroism, and twinning on (100) occurs rarely. α is just below 1·777, γ a little below 1·843. The optic axial plane is parallel to (010) and the mineral is biaxial negative with a fairly large optic axial angle. The extinction-angle (α:c) on (010) ranges up to 9°, but is difficult to determine accurately owing to the high dispersion, leading to incomplete extinction in white light. An attempt was made to obtain some measure of this dispersion, using Chance's filters. For the ruby Chance filter α:c on (010) was 8°, for the violet Chance filter it was approximately 10°. The dispersion is therefore $r<v$.

The properties listed above agree with those of acmite. It is already known that acmite (as distinct from aegirine) may be colourless or yellow in thin section, although this condition does not appear to be common.[1]

Two interesting points may be noticed in conclusion. In the first place, all previously described acmite has been flattened on (100), the form (010) being either very small or lacking. In the present instance the mineral is flattened on (010) and the form (100) is poorly developed. In the second place, the mineral cannot be regarded merely as an accessory constituent. It is quite plentiful in almost all the thin sections examined, and the microgranite of Mynydd Mawr would be more correctly described as a riebeckite-acmite-microgranite.

I wish to thank Mr. F. W. Lanham, of the Department of Mineralogy and Petrology, Cambridge, for taking the photomicrographs which illustrate this paper.

[1] H. S. Washington, Amer. Journ. Sci., 1923, ser. 5, vol. 6, p. 107; H. S. Washington and H. E. Merwin, Amer. Min., 1927, vol. 12, p. 233. [M.A. 3–374, 4–131.]