Scawtite, a new mineral from Scawt Hill, Co. Antrim.

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THE mineral now briefly described occurs as a rare constituent of the zone of hybrid rocks formed by assimilation of limestone by the dolerite intrusion at Scawt Hill, Co. Antrim.[1] It is found particularly in intimate association with the melilite-bearing types of this hybrid zone and is a constituent of some of the late-formed vesicles in these rocks. The minerals associated with it in the vesicles are chiefly calcite, thomsonite, and another zeolitic mineral as yet undetermined. These vesicles are most frequently enclosed by a ground rich in melilite, or they may occur within large crystals of melilite. In some cases the mineral forms minute venules cutting through the melilite, suggesting that it is derived in part by attack of residual solutions upon the melilite itself. All the evidence clearly indicates that the mineral is among the latest products of consolidation of the hybrid zone.

In the specimens examined, the habit is that of plates flattened in the plane of the principal cleavage. Frequently these form subparallel or slightly divergent clusters. Owing to mutual interference and intergrowth with the surrounding minerals no well-defined crystals can be isolated. The largest individuals met with do not exceed 1·5 mm. in length.

The physical properties are as follows. The density is 2·77, as determined by suspension in a mixture of bromoform and benzene, which was afterwards weighed in a pyknometer. The hardness is $4\frac{1}{2}$–5. The mineral is colourless, with a vitreous lustre. Investiga-

[1] C. E. Tilley, Min. Mag., 1929, vol. 22, p. 77; Geol. Mag., 1929, vol. 66, p. 347.

tion of the powder derived by crushing clusters of grains shows that the mineral has one perfect cleavage. Such cleavage fragments form excellent material for optical examination.

Optical properties.—By immersion in liquids the refractive indices have been determined as α 1·597, β 1·606, γ 1·621. The mineral is optically positive. The perfect cleavage is normal to a line between an optic axis and the obtuse bisectrix. These cleavage flakes show the trace of a second cleavage at right angles to the first, the extinction being parallel to this edge, which is the trace of the optic axial plane. By rotating such sections in a thick liquid, such as cedarwood-oil or Peru balsam, the fragments may be brought to lie on this second cleavage, the interference-figure of which shows that it is alined parallel to the optic axial plane. The extinction-angle of such sections between γ and the trace of the perfect cleavage is 29°. The mineral is therefore probably monoclinic. These data were confirmed by examination on the rotating stage, from which it can be shown that the normal to the perfect cleavage subtends an angle of 24° with an optic axis, the optic axial angle being approximately 2V 74°. The second cleavage is therefore taken as (010) and the perfect cleavage can be referred to (001). The orientation is then $\beta = b$, $\gamma : (001) = 29°$ (fig. 1). These optical properties cannot be associated with any known mineral, and it seemed clear that the mineral has hitherto not been described.

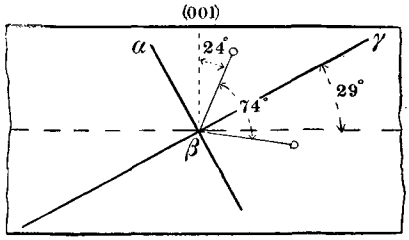

FIG. 1. Optical orientation of scawtite on the plane of symmetry (010).

Chemical Composition.—Micro-chemical tests show that the mineral is readily decomposed by weak hydrochloric acid with a marked effervescence, leaving a gelatinous residue. Furthermore, abundant lime, as shown by the oxalate test, is indicated. Qualitative tests thus indicate the presence of SiO_2, CaO, and CO_2.

In order to obtain sufficient material for analysis the crushed material of the vesicles was first hand-picked under a low-power lens, and the material thus selected was finally separated from calcite, thomsonite, and other minerals under the microscope. Owing to the intimate intergrowth of these minerals this separation was a long and tedious process. Sufficient material (0·0812 gram)

was, however, obtained, and Mr. M. H. Hey kindly undertook the analysis with the following results:

		%	Molec. Ratios.	3.	4.	5.	6.
CaO	...	46·4	0·828	5·96	4·13	5·96	4·13
SiO_2	...	34·2	0·570	4·10	2·84	4·27	2·97
CO_2	...	18·0	0·409	2·95	2·04	2·95	2·04
		98·6					

These results would indicate a formula $6CaO.4SiO_2.3CO_2$, which agrees better with the determined figures (column 3) than a formula $4CaO.3SiO_2.2CO_2$ (column 4); but it is possible that the major portion of the loss (1·4%) may be silica, owing to the difficulty of removing all the silica from the flask in which the carbon dioxide estimation was made. If we assume this to be the case, the molecular ratio of silica becomes 0·593, and the second formula then agrees better (column 6) than the first (column 5). The formulae may be written $3CaCO_3.3CaO.4SiO_2$ and $2CaCO_3.Ca_2Si_3O_8$ respectively.

It is proposed to designate this new mineral scawtite, from the original locality, Scawt Hill, Co. Antrim. Although the exact formula to be assigned to it must remain a little uncertain till larger quantities of pure material are available for analysis, the results obtained show clearly that it is a well-individualized species distinct from any other described mineral. The only other comparable mineral is spurrite, which has the composition $5CaO.2SiO_2.CO_2$ or $2Ca_2SiO_4.CaCO_3$. To this, scawtite bears no resemblance in its physical or optical properties. In rock-slices, scawtite is not a strikingly distinctive mineral. Cleavages are frequently ill-developed. It is recognized by its moderate refraction (β 1·606) and double refraction (0·024), positive sign, and positive or negative character of the elongation when parallel to the *b*-axis. In lath-shaped sections, the optic axial plane across the length, and the extinction-angle $\gamma : a = 29°$ on optic axial plane sections, are important diagnostic criteria.