The nature of cryphiolite.

CRYPHIOLITE was described by A. Scacchi[1] in 1886 as a new mineral from Vesuvius, a phosphate and fluoride of Ca and Mg, forming monoclinic crystals with the forms (in an orientation with the symmetry axis as c[001]) $A\{100\}$, $B\{010\}$, $m\{11\bar{1}\}$, $n\{\bar{1}1\bar{1}\}$, and $e\{\bar{1}20\}$, and axial ratios 1:1·180:0·601, AB 65° 52′. He also cites, to minutes, eight interfacial angles, but his text makes it clear that these are calculated values derived from three interzonal (inter-edge) angles, and that the latter were obtained with considerable difficulty; they are: $[AB]$:$[Bm]$ 121°, $[AB]$:$[Am]$ 117°, $[Am]$:$[Bm]$ 94° 30′.

Unfortunately E. S. Dana[2] took Scacchi's calculated interfacial angles for measured values, and C. Hintze[3] accepted his axial ratios, which are given to two more decimal places than his measurements warrant. H. Strunz[4] at first suggested that cryphiolite might be $CaMgPO_4F$, and isomorphous with tilasite, basing this suggestion on Scacchi's axial ratios as reported by Hintze and a choice of axes that assigns indices $A\{001\}$, $B\{10\bar{1}\}$, $m\{\bar{3}87\}$, $n\{381\}$, and $e\{\bar{3}01\}$ to the forms observed by Scacchi. Later, Strunz[5] accepted the view of F. Zambonini that cryphiolite is a calciferous variety of wagnerite.

F. Zambonini[6] re-examined cryphiolite and made new goniometric observations; he notes that the faces gave such poor reflections that he had to gum slips of mica to them, but was able to show that the angles agree satisfactorily with those of wagnerite, Mg_2PO_4F; referred to the wagnerite axes, Scacchi's $A = w\{\bar{1}01\}$, $B = a\{100\}$, $m = u\{211\}$, $n = e\{011\}$, and $e = \pi\{101\}$, a simple combination, though not one that has ever been observed on wagnerite, which has, however, a very variable habit.

The only chemical data on cryphiolite is Scacchi's; he proved that Mg, Ca, P_2O_5, and F are present, and with 69 mg. of material he found: P_2O_5 48·91, MgO 33·58, CaO 14·60, loss 2·91 %, corresponding to about 7 % F; an approximate direct estimate of the fluorine gave him 27 %.

[1] Atti R. Accad. Napoli, 1886, ser. 2, vol. 1, no. 5. Incorrectly cited by F. Zambonini, C. Hintze, and H. Strunz as A. and E. Scacchi; the paper is by A. Scacchi, but E. Scacchi drew the figures.

[2] Syst. Min., 6th edn, 1892, p. 777. Dana uses the conventional orientation with b as symmetry axis; further, Scacchi's A = Dana's $c\{001\}$, $B = a\{100\}$, $m = \mu\{110\}$, $n = n\{\bar{1}11\}$, and $e = e\{\bar{2}01\}$.

[3] Handb. Min., Bd. I, Abt. 4, p. 695. Hintze uses the same orientation as Dana but retains Scacchi's significant letters except for n; Scacchi's n = Hintze's u.

[4] Zentr. Min., 1938, ser. A, p. 59.

[5] Min. Tabellen, 1941, p. 234.

[6] Min. Vesuv., 1910, p. 313.

These data are obviously only a very rough approximation,[1] but even so they suggest a variation in the fluorine content of different samples.

When T. Deans[2] discovered the new mineral isokite, $CaMgPO_4F$, he felt it desirable to exclude the possibility that the new material might really be cryphiolite. By the courtesy of Prof. A. Scherillo of Naples, he was able to borrow one of Scacchi's original crystals; a powder photograph showed at once that isokite was something quite different, and the further examination of cryphiolite Mr. Deans left to us.

The crystal agrees in dimensions and habit with the figures and descriptions of Scacchi and of Zambonini, but the faces are too rough to give reflections, and the edges are irregular, and rounded in places. The only measurements possible confirm Scacchi's interzonal angles $[AB]:[Bm]$ and $[AB]:[Am]$. X-ray photographs show conclusively that the crystal is a pseudomorph, an unoriented mixture of apatite, sellaite, and a little wagnerite, in agreement with Scacchi's approximate chemical data. Both Zambonini's and Scacchi's[3] goniometric data agree well with the view that the original mineral of the pseudomorph was wagnerite.

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[1] The P_2O_5 percentage is obviously too high; the phosphate precipitates were probably contaminated with silica.

[2] Min. Mag., 1955, vol. 30, p. 681.

[3] Accepting Zambonini's orientation, Scacchi's and our measurements compare with the calculated angles for wagnerite as follows: $[AB]:[Bm]$ 121° A.S., 122° M.H.H., 123° 35′ calc.; $[AB]:[Am]$ 117° A.S., 117° M.H.H., 117° 31′ calc.; $[Am]:[Bm]$ 94° 30′ A.S., 94° 18′ calc.

A method of impregnating friable rocks for the cutting of thin sections.

DURING work on the alteration of granite, it was necessary to impregnate severely kaolinized specimens to enable thin sections to be prepared. Canada balsam and Kollolith would not withstand grinding and permitted the disintegration of the section if the slide were heated during covering.

Advice was therefore sought from Bakelite Ltd. who recommended the use of a resin (SR 17431), an accelerator (Q 17448), a catalyst (Q 17447), and, to reduce the viscosity, a modifying agent (Z 17453). The suggested proportions were, in order of mixing, resin 100 g., modi-