

ART. XVI.—*On the Identity of Hamlinite with Goyazite;*
by WALDEMAR T. SCHALLER.

FARRINGTON* has recently stated that the present evidence hardly seems sufficient for regarding the two minerals, goyazite and hamlinite, as identical. Damour's original formula for goyazite would then have to be accepted even though it "evidently needs confirmation" as Farrington states.

The resemblance of goyazite and hamlinite in their physical and optical properties is great enough to warrant the suggestion that their chemical composition is of the same type of formula, and since Damour's calcium has been shown to be essentially strontium, the two minerals have the same qualitative composition, both being hydrous phosphates of aluminium and strontium. If their formulas are of the same type, it is most reasonable to consider them identical—until they are proven to be different.

The table published† earlier by the writer showed the probable identity of the two minerals goyazite and hamlinite. In order to emphasize the possible distinction between these two minerals, Farrington has published a table of differences between them; there are, however, three errors in the six items listed in this table.

The percentage of P_2O_5 for hamlinite is wrongly given as 20.92 per cent. It should be 28.92 per cent. The suggestion was earlier made that the separation of P_2O_5 from Al_2O_3 was probably not accurate in Damour's analysis of goyazite, so that the comparison between the sums of P_2O_5 and Al_2O_3 for the two minerals (65.53 and 62.87), is probably the most valid comparison of the analytical figures.

Goyazite is stated by Farrington in his table to be "Infusible." The original description states‡: "A la flamme du chalumeau, il fond difficilement sur les bords des plus minces fragments." Damour's statement regarding goyazite, "il fond difficilement," and Penfield's statement for hamlinite, "fuses about 4," show a resemblance, not a difference.

The table of Farrington states further that hamlinite is "slowly soluble in acids." This statement, quoted in Dana's System of Mineralogy, on page 762, must be somewhat modi-

* Farrington, O. C., Studies of Brazilian favas, this Journal (4), xli, p. 358, 1916.

† Schaller, W. T., The alunite-beudantite group, this Journal (4), xxxii, 359, 1911. Also, U. S. Geol. Survey Bull. 509, p. 70, 1912.

‡ Damour, A., Note sur un nouveau phosphate d'alumine et de chaux, des terrains diamantifères, Bull. Soc. Min., France, vol. xvii, 204, 1885.

fied by Penfield's later statement* that "hamlinite is almost insoluble in boiling dilute hydrochloric acid," and by Bowman's statement† that the "mineral is insoluble in hydrochloric acid."

By correcting these errors in Farrington's table, the main supposed differences disappear and the list of similarities of the two minerals, as shown below, is sufficient to justify the conclusion that hamlinite is identical with goyazite—at least until their difference is proven.

Similarities in properties of goyazite and hamlinite, supporting the conclusion that the two minerals are identical.

<i>Goyazite</i>	<i>Hamlinite.</i>
Yellowish white.	Colorless, yellowish, honey-yellow, reddish brown.
More or less transparent.	Transparent.
Uniaxial, positive.	Uniaxial, positive.
Cleavage, good, basal.	Cleavage, good, basal.
H = 5.	H = 4.5, 4+.
S.G. = 3.26	S.G. = 3.228, 3.2, 3.159 — 3.283, 3.219 — 3.266.
Fuses with difficulty.	Fuses about 4.
Not attacked by acids.	Insoluble in HCl.
Per cent $\text{Al}_2\text{O}_3 + \text{P}_2\text{O}_5 = 65.53$.	Per cent $\text{Al}_2\text{O}_3 + \text{P}_2\text{O}_5 = 62.87$.
Per cent H_2O (det. by loss on ignition?) = 16.67.	Loss on ignition (hamlinite from Switzerland) = 15.6 to 16.0 per cent.
Hydrous phosphate of aluminium and strontium.	Hydrous phosphate of aluminium and strontium.

* Penfield, S. L., On the chemical composition of hamlinite and its occurrence with bertrandite at Oxford County, Maine, this Journal (4), iv, 313, 1897.

† Bowman, H. L., On hamlinite from Biennenthal, Switzerland, Mineralog. Mag., xiv, 391, 1907.