URMISCA/1-2

(1)

A MONTICELLITE-NEPHELINE-BASALT FROM TASMANIA: A CORRECTION TO MINERAL DATA.

By C. E. TILLEY.

F. P. Paul described in 1906 (T.M.P.M., vol. 25, p. 309) a nepheline-eudialite-basalt from Shannon Tier, Tasmania, containing an unknown mineral referred by him to Ca_2SiO_4. Subsequently Bowen (Amer. J. Sci. 1922, p. 30) pointed out the close correspondence between the optical properties of Paul's mineral and of the artificial B-Ca_2SiO_4 prepared by Day, Shepherd and Wright. Still later (Geol. Mag. 1927, p. 43) the writer of this note ventured to apply the name shannonite to the mineral of this singular occurrence. Since that time through the kindness of Mr. P. B. Nye, Government Geologist of Tasmania, a specimen of the rock described by Paul from Shannon Tier has been obtained and examined. That the specimen examined is identical with the rock dewcribed by Paul is clearly indicated by his detailed description and the photomicrograph which accompanies his paper. Unfortunately my own determinations are not in agreement with those of Paul, and the purpose of the present note is to state the nature of these discrepancies.

The rocks is a felspar-free nepheline-basalt of which the chief constituents are idiomorphic nepheline, a titaniferous augite, olivine (chrysolite), the unknown mineral of Paul, biotite, apatite, magnetite, perofskite, and miner amounts of interstitial analcime. The described eudialite has not been discovered, and from the description attached to the photomicrograph this mineral appears to have been confused with nepheline I find further that the properties of the unknown mineral agree, not with those of any of the artificial calcium orthosilicates, but with those of monticellite. The two olivines are readily distinguished in thin section, the chrysolite occurring as chadacrysts and the monticellite as oikocrysts, the latter --

(2)

appearing as shapeless grains often surrounding chrysolite and enclosing numerous idiomorphic crystals of nepheline and magnetite, and thus belonging to a late stage in the crystallization history of the rock. The chrysolite moreover is readily distinguished -apart from these textural differences - by its higher birefringence and larger optic axial angle (near 90°)

The refractive indices of Paul's mineral lie between 1.66 and 1.68, much below the values 1.718 to 1.740, indirectly arrived at by Paul. The mineral is optically negative (not positive as stated by Paul), and possesses a considerably lower optic axial angle than chrysolite, sections normal to the optic axis showing a marked curvature of the isogyre. (Using Paul's value of E and B as 1.67, 2V = 67°, while monticellite from Isle Cadieux has 2V = 70° ± 5°). It may be convenient to restate Heidenreich's analysis of the rock as follows :-
SiO_2 36.03, Al_2O_3 15.19, Fe_2O_3 5.94, FeO 9.55, MgO 8.60, CaO 15.52, Na_2O 4.23, K_2O 1.85, H_2O (ignition) 0.58, P_2O_5 1.38, TiO_2 1.13, MnO 0.17, ZrO_2 0.21.

This analysis corresponde fairly closely with that of a melilite-nepheline-basalt from Sebusein, Bohemian Mittelgebirge. From the analysis and further data provided by Paul the Tasmanian rock has the mineral composition approximately - nepheline 27% Augite 27%, monticellite 27%, chrysolite 14%.

It is necessary to conclude that calcium orthosilicate does not occur in this Tasmanian rock, nor in any igneous rock yet described. The mineral is monticellite and the name shannonite - given from Paul's data - must therefore be withdrawn. I have indicated elsewhere the occurrence of calcium orthosilicate as an abundant constituent of certain contact limestones, but a detailed description of this occurrence has yet to appear.
