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[5] [P. Eremeyev] П. Еремѣевъ, Зап. Имп. Мин. Общ. (Verhandl. Russ. Min. Gesell.), 1869, new ser., vol. 4, p. 201.
[6] [N. G. Sumin] *Н. Г. Сумин*, Труды Мин. Муз. Акад. Наук СССР [Trans. Min. Mus. Acad. Sci. USSR], 1955, vol. 7, p. 161 [M.A. **13**–189]. According to Sumin, the original discovery of chlorospinel by Bardot de Marin in 1833 was at the Praskovie-Evgenevsky mine; but Rose merely gives the locality as Slatoust, while Koksharov and Eremeyev, writing in the 1860's, describe this mine as 'newly discovered'.
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## *Mordenite, ptilolite, flokite, and arduinite.*

Mordenite and ptilolite were first recognized as identical by Bannister[1] from a study of X-ray powder and rotation photographs. This observation was recorded in a footnote to a paper on heulandite by Hey and Bannister,[2] and was confirmed by Waymouth, Thornely, and Taylor,[3] who examined ptilolite from San Piero in Campo, Elba (B.M. 1914,321), mordenite from Aros, Isle of Mull (B.M. 47614), and type flokite (B.M. 1932,1297). They determined single crystal X-ray data for the Mull mordenite, but X-ray powder data were not recorded until 1954, when Harris and Brindley[4] gave results for the Mull mordenite above, together with cell dimensions derived from them. Dr. Hey has drawn attention to the fact that no X-ray data have hitherto been obtained on type specimens of mordenite or ptilolite, or on material from the type localities. This precaution is particularly desirable in view of the confused early history of mordenite.

Flokite[5] has also been recognized as identical with mordenite[1,3,6] and Bannister[7] has suggested that arduinite is impure mordenite. Stringham[8] compared arduinite from the type locality with a red zeolite from Tintic, Utah; he found that they gave identical X-ray powder patterns and optical data, but that both the unit-cell dimensions and the space group are the same as those of mordenite, and a chemical analysis of the Tintic material gave a composition near that of type mordenite.[9] Though Stringham had no authentic mordenite for comparison, he concluded that Billows' analysis[10] is in error, and arduinite is mordenite coloured by a little hematite.

Accordingly I have examined samples of all four species, namely: B.M. 43716, Mordenite, Morden County, Nova Scotia (type material from Prof. How); B.M. 1932,1312, Mordenite (ptilolite), Green Mountain, Colorado (type locality); B.M. 1932,1297, Mordenite (flokite), Eskefjord (?), Iceland (type material); B.M. 1923,145, Mordenite (arduinite), Val de Zuccanti, Valdagno, Venetia, Italy (type locality).

Powder photographs were taken of the four specimens in a Phillips camera, 11·46 cm. diameter using Cu-$K\alpha$ radiation. The four photographs are identical as to line positions and show no significant variations in relative line intensities. Measured $d$-values agree with each other and with those listed by Harris and Brindley to within 0·1 %, except for the highest spacings, and the estimated relative intensities agree well with theirs. The results are therefore not repeated here and the data of Harris and Brindley can be accepted as applying to all varieties of mordenite.

The $d$-values for each photograph were assigned indices from the available unit-cell data[3,4,8] and examined for any systematic variation in cell dimensions. None was found, and the values obtained agree with those of Harris and Brindley within the limits of experimental error. The unit-cell volume is therefore $2800 \pm 10$ Å.$^3$ for all mordenites, agreeing well with the value 2805 Å.$^3$ calculated from the data of Waymouth *et al.*; Stringham's[8] value for arduinite, 2753 Å.$^3$, is not confirmed.

This constancy of the unit-cell dimensions of five mordenites from different localities contrasts with the variable composition of the mineral,[11] and supports the suggestion of Waymouth *et al.* that the structure is based on a rigid $(Si,Al)_{48}O_{96}$ framework.

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