SHORT COMMUNICATIONS

Juddite from Kajlidongri manganese mine, Jhabua District, Madhya Pradesh, India.

WHILE studying the minerals from the Kajlidongri mine, I came across a red amphibole showing remarkable pleochroism and optical characters. The mineral occurs as small prisms, usually 2 to 3 mm. long, and is red in colour. The manganese ore associated with the mineral is of a striking reddish colour. Under the microscope the mineral is seen to occur as small prisms in a medium-grained quartzite showing a slight schistose texture. Where it occurs with the manganese ore the mineral is usually associated with blanfordite, calcite, and biotite.

The optical characters of the mineral are as follows: α 1·659, γ 1·681, γ–α 0·022, $2V_\gamma$ 66° to 72°, α:[001] 21° to 33°, elongation negative; pleochroism: α light carmine to deep carmine, β colourless to pale blue with a tinge of violet, γ light pinkish orange to orange with sometimes a tinge of brown, $\alpha > \beta > \gamma$. There is, however, great variation in the pleochroism. In some cases it is zonal with the stronger colour in the central part.

The optical characters of the mineral under study are very similar to those of the amphibole juddite described by the late Sir Lewis Fermor[1] who first described it from Kacharwahi in the Nagpur District. Fermor noted the remarkable pleochroism of the amphibole and named it in honour of Prof. J. W. Judd, as a tribute from a former student. Bilgrami[2] has also reported juddite from the Chikla mine, Bhandara District, Maharastra State, and has given its optical properties and chemical analysis. Recently Zwaan and Van Der Plas[3] described the optical and X-ray properties of juddite from the Nagpur District. The optical characters of the amphibole, such as negative elongation, positive optic axial angle, and refractive indices suggest that it is closely related to the alkali amphiboles, especially to the riebeckite group as described by Miyashiro.[4]

This work was carried out at the Laboratory of Applied Geology,

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[1] L. L. Fermor, Mem. Geol. Surv. India, 1909, vol. 37, pt. 1, p. 159.

[2] S. A. Bilgrami, Min. Mag., 1955, vol. 30, p. 636.

[3] P. C. Zwaan and L. van der Plas, Konink. Nederl. Akad. Wetensch., ser. B, 1958, vol. 61, p. 266.

[4] A. Miyashiro, Journ. Fac. Sci. Univ. Tokyo, Sect. II, 1957, vol. 11, p. 57.

Saugar University. I am grateful to Prof. W. D. West for critically going through the paper.

Dept. of Applied Geology,
University of Saugar,
Saugar, (M.P.), India.

V. K. NAYAK

The identity of namaqualite with cyanotrichite.

IN 1870 (Jour. Chem. Soc., vol. 23, p. 1) Professor A. H. Church described as a new mineral, namaqualite, some material obtained by J. R. Gregory, who brought it from Namaqualand in South Africa. Church's description is as follows:

> . . . Namaqualite occurs in thin layers of silky fibres which are true crystals, though their minute size and general absence of distinct terminations renders it impossible to ascertain the system to which they belong. The layers alternate with irregular bands of a kind of chrysocolla, and are sparingly mixed with small crystals of magnesia mica. The aspect of namaqualite resembles that of chrysolite [i.e. *chrysotile*], but its colour is pale blue with a silky lustre. Its hardness is 2·5, and its density 2·49. Isolated crystals appear transparent under the microscope. In the closed tube it gives off much water when heated, becoming black.
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> For analysis, the mineral was coarsely crushed, and the homogeneous fragments carefully picked out under the microscope. . . . The mean percentages are: H_2O 32·38, CuO 44·74, Al_2O_3 15·29, CaO 2·01, MgO 3·42, SiO_2 2·25, Sum 100·09.

Church therefore considered it a hydrated copper aluminium oxide, and suggested a possible relationship to hydrotalcite and pyroaurite. Apparently no further investigation has been reported in the literature since Church's original paper.

In the mineral collection of the American Museum of Natural History there is a single specimen (no. 6176) labelled 'Namaqualite, Namaqualand, South Africa', which agrees with the description given by Church. It was purchased from J. R. Gregory, and is probably part of the same material he supplied to Church. In immersion liquids under the microscope the blue mineral appears as aggregates of fibrous crystals, strongly pleochroic from almost colourless to bright blue, and with α 1·59, γ 1·65; these properties are identical with those of cyanotrichite, and the identity was confirmed by the comparison of an X-ray powder photograph with that of a specimen of cyanotrichite from Moldawa, Rumania. The analysis given by Church evidently reports as H_2O the loss in ignition, which would include the SO_3 also present in cyanotrichite. The formula of cyanotrichite requires 12·4 % SO_3 and 22·4 % H_2O, their