NOTE ON ZARATITE FROM BOHEMIA, PENNSYLVANIA AND TASMANIA

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In the carboniferous formation of central Bohemia, millerite is a rather frequent mineral in the cavity fillings of sideritic septaria, and in geodes and veinlets in the arkoses and other sediments. The localities are numerous: Rapice, whence millerite was first mentioned by Em. Bořický, Kladno, Jemníky, Pchery, Motyčín, Dubí, and Libušín. The last locality has furnished a specimen now in the National Museum, which on a surface of about 40x20 cm. carries a dense felt of millerite needles, some of them over 4 cm. in length. The millerite and other sulphides are constantly associated with older ankerite and earthy nacrite, frequently also with barite and whewellite crystals, which are the youngest members in the paragenesis.

Nearly twenty years ago, the late professor Adolf Hofmann, of the Příbram School of Mines, brought to Prague from the Praga mine, near Dubí, specimens of millerite which were covered with a very thin film of an emerald-green secondary mineral. The nacrite aggregates in the vicinity are also impregnated and colored by the same alteration product of millerite. It was recognized as zaratite but chemical proof was not possible as the millerite needles were firmly inter-grown with the siderite matrix.

Last autumn I obtained through the kindness of Mr. J. Hummel, mining engineer at Motyčín (Ronna mine) several magnificent specimens of siderite concretions with millerite tufts in their septaria. These were freely developed in the cavities with single millerite needles[1] two centimeters and more in length. Many of them show a splendid emerald-green surface due to a very thin film of a secondary mineral.

On these samples, the carbonate material of the alteration product has been established and the green mineral is really zaratite, as had been supposed. An entirely satisfactory optical examination of the zaratite from Motyčín was not possible as the films are so thin that flat lying particles of them appear in the microscope quite isotropic and only where they have remained on millerite crystals and the light passes through a thicker part along the borders can a feeble birefringence be observed. The whole coating on a single millerite needle is optically uniform and

[1] Very rarely beyrichite has been found also in the same paragenesis.

the direction parallel to the vertical axis of the millerite is positive. The refractive index varies within the limits 1.565 to 1.566.

If we compare these observations with the hitherto known data on zaratite, a considerable variation in this mineral becomes manifest; the colloidal and metacolloidal hydrated carbonate of nickel behaves in the same manner as those of magnesium and zinc. Like hydromagnesite with the related minerals, and like hydrozincite, the zaratite seems to include different substances both amorphous and cryptocrystalline, which represent different stages in the development from gels to crystalline aggregates.

In the work of Mr. E. S. Larsen on the Microscopic Determination of Non-opaque Minerals, zaratite is mentioned (p. 158) as an isotropic mineral; the sample used by him was from the Wood mine, Texas, Lancaster Co., Pennsylvania, and showed a banded structure and a refractive index varying within the broad limits from 1.56 to 1.61.

In the collections of the Mineralogical Department of Charles University at Prague, there are zaratite specimens from two known localities; from the Wood mine, and from Hazelwood in Tasmania. On the sample from the Wood mine the zaratite forms a thin minute mammillary crust on chromite. Microscopically it consists of spherocrystals or of thin layers, the fibers of which are orientated perpendicular to the surface, as in malachite or thermal aragonite. The extinction is parallel to the elongation of the fibers, which have an optically positive sign. The double refraction is moderate, the refractive indices vary within rather wide limits: in some fibers the refraction both parallel and perpendicular to the length is higher than 1.56, while in others in parallel orientation it reaches about 1.562. Perpendicular to the length it is a little lower than 1.559. Only a small admixture of amorphous material could be observed in the zaratite powder in our specimen; its index of refraction is approximately 1.56.

In the powder preparations of the zaratite from Hazelwood the amorphous constituent is not so scarce as in the sample from the Wood mine. The isotropic substance shows a lighter green color than the fibrous one. Its refractive index is 1.565. The fibers of the spherocrystals and the parallel aggregates show a distinct though feeble pleochroism: parallel to the length the absorption is stronger and the color emerald-green, perpendicular thereto a lighter, slightly yellowish green. The extinction is always parallel to the length. The mean refractive index is higher than in the Pennsylvania specimen and is variable but near 1.589.