Origin of hollandite from Kajlidongri mine, Madhya Pradesh, India

THE name hollandite was proposed by the late Sir Lewis L. Fermor (1906) after Sir Thomas Holland, the then Director of the Geological Survey of India. Since then the mineral has been found at several places in India and other parts of the world. At Kajlidongri manganese mine (22° 57′N, 74° 31′E), Jhabua District, Madhya Pradesh, India, the mineral occurs in crystalline aggregates and fibrous forms, which are associated with the quartz-veins that traverse along and cut across the manganese-ores and the associated rocks (Nayak, 1962). An interesting fact observed is that the mineral is abundant to the south of the waist, a constriction in the middle of the mine, and is absent from the north of the waist of the mine.

Several pits to the south of the waist of the mine are the best locations where the relationship of hollandite with the quartz-veins and the manganese-ores has been studied. In these pits quartz-veins traversing the manganese ore-body present a remarkable parallelism in a N 45° E direction. The hollandite usually occurs at the contact of the manganese-ores and the quartz-veins and varies in size with a maximum crystal length of one inch; the crystals have usually developed perpendicular to the direction of quartz-veins though an inclined development is also seen at some places. Fibrous hollandite also occurs at the contact of quartz-veins and the manganese-ores, with fibres grown perpendicular to the direction of the veins; in some cases the fibres from both sides of the vein join and form a rope-like structure. It is normally free from other mineral associations although in a few cases calcite, piemontite, and feldspars were seen with it.

Mineragraphic study of the manganese-ore (Nayak, op. cit.) showed that it consists predominently of braunite, psilomelane, sitaparite, hematite, and some secondary pyrolusite. The analyses of the ores from south of the waist showed 4·14 % BaO, while those from north of the waist have only 0·79 to 1 % of BaO (Fermor, 1909).

Discussion and possible origin: Fleischer and Richmond (1943) found that hollandite is formed as the dehydration product of psilomelane. Wadsley (1950) synthesized several manganese minerals by hydrothermal alteration of metallic derivatives of hydrous manganese oxides, and obtained psilomelane by heating the barium derivative at 160° C for several weeks with a solution containing 1 % barium and manganese chlorides. Heated to 500° C this material gave a substance similar to

hollandite whose properties agreed with those given by Fleischer and Richmond (op. cit.). These experiments clearly show that a certain minimum temperature and some barium in the manganese ores are essential factors for the formation of hollandite.

The well-developed crystals of hollandite found at the contact of the quartz-veins and the manganese-ores suggest that silica-rich residual fluids were probably at a temperature between 500 and 600° C, which at the contact of manganese-ores was sufficient for the dehydration of a psilomelane type of ore (containing barium) to hollandite. The fibrous hollandite and the hollandite crystals have the same field relationship and as such they must have formed under the same conditions, though the manner of formation of these morphologically different hollandites is not yet clearly understood. It is concluded, therefore, that the manganese-ores rich in barium and the temperature of about 500–600° C of the silica-rich solutions forming the quartz-veins resulted in the formation of hollandite at the Kajlidongri Mine.

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Two pseudometeorites: Leroy and Newtown

IN 1914 Mr. J. Pierpont Morgan purchased the meteorite collection of the late E. E. Howell from his estate and presented it to this museum. Included in this collection was a 102-gram piece of rusty metal labelled 'Leroy'; no other information concerning its source is available. It was briefly mentioned by MacNaughton (1926). The specimen is a porous