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Sinhalite and serendibite from Tanzania

EVER since Claringbull and Hey (1952) first described the mineral sinhalite, which had previously been identified as gem peridot, other discoveries have been reported (Meixner, 1953; Zwaan, 1955; Payne, 1958; Gübelin, 1962). Essentially sinhalite is found in skarn assemblages from contact zones of metamorphosed carbonate rocks with, for example, Archean gneiss (Aldan massif, U.S.S.R., Shabynin, 1956) or granite (Warren County, New York, U.S.A., Schaller and Hildebrand, 1955). It is mineralogically similar to forsteritic olivine but can be distinguished by its higher refractive indices, specific gravity, and a much smaller optic axial angle. Chemically, boron substitutes for silicon and part of the magnesium is replaced by aluminium in the olivine structure. Optical absorption spectra have also shown that minor but significant amounts of iron are present as Fe^{2+} giving a chemical composition of $\text{AlMg}_{0.95}\text{Fe}_{0.05}\text{BO}_4$ (Fang and Newnham, 1965).

This paper discusses a further occurrence of sinhalite in a skarn assemblage from the Handeni district, north-east Tanzania. The mineral was provisionally identified by the writers during 1964 in a sample of calcitic marble from the Kwakonje area. A brief note on this occurrence has already been published by one of us (von Knorring, 1967); additional information on the locality and the associated minerals including serendibite and warwickite is given in this communication. It is worth noting that this is the first recorded *in situ* locality of sinhalite in the African continent.

The locality in Tanzania is known for its production of gem quality tourmaline, blue and red spinels, and the occasional ruby. More recently kornerupine was identified by Dr. R. A. Howie (personal communication) in a marble collected from the

same area. These varied mineral assemblages are confined to a narrow marble ridge striking N.-S. forming a prominent topographical feature for 2-3 miles within the Usagaran Pre-Cambrian metasediments. The Tanzanian sinhalite, easily recognized in hand specimen, is light pink to brownish-pink in colour, occurring as rounded grains of about 1 mm in diameter, or occasionally as larger aggregates up to 10 mm diameter, confined to clusters and concentrations of skarn minerals in a medium to coarse-grained calcitic marble. The associated mineral assemblage consists of red spinel, yellowish-green tourmaline, abundant chrome-tremolite, colourless forsterite, pyrrhotine, graphite, warwickite, calcite, and a greyish blue-green mineral (discussed later). The analysis of the Tanzanian sinhalite (von Knorring, 1967) compares closely with the analysis of the original material described by Claringbull and Hey (1952). It is also interesting to note that the Tanzanian sinhalite is associated with red spinel. Shabyinin (1956) clearly regards sinhalite as a pseudomorph after spinel, and thus the distinctive pink colour of the Tanzanian occurrence must be considered as having been derived in a similar manner.

Serendibite, an Al-Ca-Mg borosilicate, was first collected and described by Prior and Coomáraswámy (1902) from a granulite-limestone contact zone 12 miles E. of Kandy, Ceylon. Numerous other discoveries in skarn assemblages have since been reported but one in particular, Warren County, New York, U.S.A. (Larsen and Schaller, 1932) is noteworthy because of its association with sinhalite.

Although occurring in minor amounts, a few grains of a greyish blue-green mineral were hand picked for an X-ray powder photograph. The pattern for the Tanzanian material was identical to serendibite from Warren County (BM 1923, 1035). Additional confirmation was obtained by refractive index measurements and emission spectrographic analysis.

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Zeolites and other minerals from Dean quarry, the Lizard, Cornwall

THIS is a preliminary account of an interesting occurrence of minerals in the Lizard. Dean quarry is adjacent to Dean Point, two miles NE. of Coverack on the east coast of the Lizard peninsula, Cornwall, and is situated on the large intrusion of gabbro that extends northwards from Coverack to St. Keverne, and from Manacle Point in the east to Trelan in the west. The gabbro and its petrography have been described in detail in the Geological Survey's memoir¹ on sheet 359. The major part of the gabbro in this quarry is of the type described as 'grey-green' or 'flaser' gabbro in the memoir, but it varies in texture from schistose to pegmatitic.

The author has visited the quarry from time to time during the last fifteen years and found nothing of unusual mineralogical interest, except for some remarkably coarse gabbro pegmatite, with pyroxene crystals up to 25 cm in length, or appreciably longer than the largest recorded in the Lizard memoir. During a visit in 1967 zeolites and other minerals were found. High on the quarry face, quite out of reach, was a circular patch of white crystals, about 50 cm in diameter and slightly concave, which suggested it might have formed part of a geode. Eventually some specimens were discovered among the debris formed by blasting.

The most prominent of the zeolites is analcime, which occurs in trapezohedra, {211}, up to 4.5 cm in diameter. It is usually white, but sometimes stained brown. Most of the white crystals are translucent, but a few are sub-transparent. The {100} cleavage is often fairly well developed.

The analcime is frequently accompanied by natrolite up to 4 cm in length, in the form of closely packed divergent groups or separate euhedral crystals. The natrolite is prismatic to acicular in habit; in some crystals the prism {110} is terminated by {111}. These crystals are much finer than any the author has seen from Chynhalls Cliff, south of Coverack, an occurrence of natrolite in the Lizard that has long been known.

¹ J. S. Flett, *Geology of the Lizard and Meneage*, 2nd edn, 1946.