

The Colour of the Blue Quartz of the
Charnockites of South India and of the
Opalescent Quartz-Gneiss of Mysore.

HOLLAND¹ investigated the greyish blue charnockite quartz of South India and observed the presence of acicular inclusions which he considered to be rutile. He reported that the colour of the quartz was probably due to those inclusions but he does not appear to have either isolated the inclusions or carried out a chemical investigation of the quartz specimens.

Specimens of the charnockite quartz with varying intensity of blue colour as well as of blue quartz from the opalescent quartz-gneiss of Kadur District (Mysore) were examined in the course of this work, both microscopically and chemically. The colour of these quartzes which is of a yellowish tone by transmitted light and blue by reflected light was found to be greatly affected by heating the charnockite quartz losing its colour completely even at 300°.

Thin sections of these quartzes show under the microscope a large number of inclusions which can be classified under two heads,

(a) regularly arranged acicular inclusions (*Microphotograph 1*) and (b) the more or less drop-like and dust-like inclusions which show large variations in size and are often arranged similar to chains of beads (*Microphotograph 2*). The quartz grains appear under the microscope to be built up of many crystal grains in different orientations, and also exhibit wavy extinction. The acicular inclusions often extend into adjacent fragments of the quartz in unbroken continuity thereby indicating either a secondary origin or a secondary arrangement.



Fig. 1.

Blue quartz "B" with the acicular and dust-like inclusions—in transmitted light. $\times 200$



Fig. 2.

Blue quartz "B" with the dust-like and drop-like inclusions—in transmitted light. $\times 600$

All the coloured quartzes show under the microscope a pale brownish-yellow turbidity,

the intensity of which was found to vary with the intensity of the blue colour in the specimens. This turbidity is destroyed by heat in the same way as the blue colour.

This brownish-yellow turbidity was not noticeable in the colourless quartz from Pallavaram (Madras) obtained close to the charnockite masses, and which also contained acicular inclusions similar to those in the blue quartz. Another colourless quartz obtained from Bodi-Charnockite (Madura) contained drop-like and dust-like inclusions, but did not reveal the presence either of acicular inclusions or of the brownish-yellow turbid medium. These observations show that neither of these kinds of inclusions is responsible for the blue colour, and that the brownish-yellow turbid medium is observed only in the coloured specimens and not in others.

Boiling with hydrochloric acid freed the crushed specimens from the iron present as an impurity, but since the blue colour of the specimen persisted even after this treatment, it is evident that iron compounds do not contribute to the colour of the specimen.

The acicular inclusions were separated from the quartz by the method recently proposed by Postelmann² and were found to be very fine needles of rutile. Chemical analysis revealed that all the quartzes examined contained significant amounts of titanium, the titanium contents of the specimens being proportional to the depth of colour.

The quantity of rutile present in the specimens was estimated microscopically and found to be roughly the same even in specimens of different intensities of colour. Since chemical analyses revealed, however, that the intensity of colour was proportional to the titanium content of the specimen, it follows that the specimens contained titanium not only as rutile but also in some other non-crystalline form. This deduction is justified by the discovery of (1) the brownish-yellow turbid medium referred to already in all the coloured specimens, (2) the destruction of this turbidity and the accompanying loss of colour on heating.

It can therefore be stated in conclusion that the colour of the specimens of quartz examined appears to be due almost entirely to the existence of a brownish-yellow turbid medium, which contains titanium

in a colloidal condition. Further work on this problem is in progress and full details will be published elsewhere.

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¹ *Mem. Geol. Surv. India*, 1900, **28**, 2.

² *Neues Jb. Mineral. Geol. Palaeont.*, 1937, **Bd. 72**, Abt. A, 401.
