A note on 'bleached hornblende'.

THE presence of 'bleached hornblende' was noted by Dunn and Dey (1942) in dioritic rocks of Singhbhum, Bihar. Saha (1954) described the colourless amphibole from the granodiorites of Mayurbhanj; the loss of colour was thought to be due to replacement of iron by alkalis.

The phenomenon of bleaching actually entails some mineralogical transformation. As compared with the bleaching of biotite, in the case of hornblende not only does the mineral lose its characteristic absorption colours but there are distinct changes in optical characters.

FIG. 1. Bleached hornblende invading coloured hornblende. $\times 12\frac{1}{2}$.

Near the village Kadakora (22° 6′ N., 85° 39′ E.), Singhbhum, Bihar, a lenticular amphibolite body has been invaded by gneissic granite and is exposed in a few isolated patches within the basic body. The basic metamorphites under the microscope reveal the presence of 'bleached' amphibole; the dominant coloured amphibole approaches common hornblende in its optical characters (Winchell, 1951). Bleaching takes place along cleavages and edges of the mineral but preferentially along the trace of (001) plane (see fig. 1). The boundary between the two types is often very sharp and usually straight, and the two can be distinguished easily even between crossed nicols because of the contrast in interference colours. The optical characters of the colourless amphibole may be compared with those of the parent coloured amphibole (which has α pale green, β green, γ darker green in thin section) and with those of the colourless amphibole described by Saha:

Colourless . . .	α 1·626	γ 1·655	$2V_\alpha$ 68° ± 2°	$\gamma:c$ 22°
Coloured . . .	1·624	1·651	—	21°
Colourless (Saha) . .	1·623	1·649	67°	19°

The volumetric proportion of the bleached amphibole is found to increase towards the granite, together with an increase in the amount of biotite. The two phenomena (bleaching and biotitization of amphibole) could be correlated with an influx of alkalis—hydrothermal solutions from the granite. Bleaching of amphibole has also been noticed in this locality in the calcgneissic rock along a zone of hydrothermal

activity and in basic inclusions near the periphery of the granite body (Bose, 1957).

A parallel example has also been observed associated with an amphibolite band in contact with granite gneiss near Bhagwa (23° 43′ N., 86° 21′ E.), Bihar (Bose, 1955). Here thin sections of the systematic samples at an interval of 3 yards (towards the granite) revealed the stages and mode of transformation of the coloured amphibole into the 'bleached' type. The initiation of alteration is marked by the appearance of fine colourless striations (parallel to the trace of (001)), which gradually widen to narrow stripes and finally appear as bands and then encroach along the cleavage direction in prismatic grains and ultimately replace a major part of the hornblende, leaving some islands of coloured rectangular blocks (with major axis parallel to the trace of (001)). The coloured amphibole in this stage often shows twin lamination in prismatic sections, which in rare cases are parallel to (001). Micrometric analyses of thin sections not only show an absolute increase of the bleached type but also increase in the ratio of colourless to total amphibole towards the granite boundary.

The increasing amount of bleaching towards the granite and the regular pattern in the bleaching suggest the phenomena to be an instance of intralattice metasomatism produced by hydrothermal solutions from the granite.

Geological Laboratory,
Presidency College,
Calcutta.

MIHIR KUMAR BOSE

M. K. Bose, Proc. 42nd session Indian Sci. Congr., 1955; ibid., 44th session, 1957.
J. A. Dunn and A. Dey, Mem. Geol. Surv. India, 1942, vol. 69, pt. 2.
A. K. Saha, Journ. Geol. Min. Met. Soc. India, 1954, vol. 26, no. 2.
A. N. Winchell and H. Winchell, Optical Mineralogy, 1951, 4th edn., pt. 2.

A preliminary note on chromian mica in an ankerite–quartz–pyrite rock from southern Ross-shire, Scotland.

PUBLISHED records of British examples of chromium-bearing muscovites are, to my knowledge, restricted to two occurrences of 'fuchsite' noted by Heddle[1] from Argyllshire, and by Clough[2] from Glenelg, Inverness-shire. It is, therefore, of considerable interest to record a new occurrence of a chromian mica from southern Ross-shire, Scotland.