philic) and Khairpur the other end member, in which the silicate phase is almost entirely depleted in titanium.

Iron and phosphorus closely follow the behaviour of titanium while chromium and manganese do not. There appears to be no correlation between the Mn, P, and Cr in the silicate phase and the amount of ferroalabandine, schreibersite, or daubréelite in the meteorite. Since these phases only amount to 1 % or less, any inhomogeneity or deviation from a completely closed chemical system would obscure correlation.

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Cutting of stony-iron meteorites

Stony-iron meteorites can be difficult to cut using normal rock-cutting diamond wheels and impossible using hacksaws. On the suggestion and with the help of Mr. G. J. Burton, who is responsible for rock sectioning and polishing in the Department of Mineralogy, British Museum (Natural History), experiments were tried using a diamond-coated hacksaw blade in a power hacksaw. It was found that it provided an effective way of cutting stony-iron meteorites as well as other meteorites and rocks.

A new Eclipse high-speed steel blade (14 × 1 × 0·050 in., 14 teeth/in.) had the teeth ground down to half their original depth and then coated with a 0·006 in. thickness of P.S. 60–72 ♯ diamond grit by the Diaface electroplating process. It was used in an unadapted workshop power-hacksaw with water as coolant.

The method was tried first on the Bencubbin mesosiderite, which has been reported as being particularly hard to cut by any means. A smooth cut about 2 mm wide leaving a face with an area of 33 cm^2 and depth of 6 cm was made without difficulty in 40 min. The cut face showed about 35 % stony material and 65 % iron. L. M. Van Mappes and Sons (Diamond Tools) Limited, Basingstoke, Hampshire, kindly examined their diamond plating on the blade and reported a very little diamond wear and slight smearing of the plating metal.

A trial on a specimen of granite gneiss was equally successful and the cutting rate was three times faster by either area or depth of cut.

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Spectroscopic evidence for the siting of lithium ions in a riebeckite

IN an infra-red study of the hydroxyl bands of some clino-amphiboles Burns and Strens (1966) reported that iron-free tremolite shows a single sharp peak in the hydroxyl-stretching region. Since the hydroxyl group in the amphibole structure is co-ordinated to three cations (M_1, M_2, M_3) (Whittaker 1960), to form a pseudo-trigonal pyramid, the substitution of Mg^{2+} by a second cation causes a maximum of four bands to be observed. The positions of these bands depend upon the electronegativity of the substituting ion. The relative intensities of these bands have been used to give information about the extent of any cation ordering within the M_1 and M_3 sites (Strens, 1966).

A similar study of the hydroxyl stretching region for members of the riebeckite series, $Na_2Fe_2^{3+}(Fe^{2+},Mg)_3Si_8O_{22}(OH)_2$, showing varying substitution in the M_1 and M_3 sites has been carried out. The fundamental O–H stretching vibration was recorded on a Perkin-Elmer model 521 spectrophotometer in the region 3600 to 3700 cm^{-1}, the KBr disc method being employed. The spectra were obtained at room temperature and are shown in fig. 1. The positions of the bands are shown in table I together with the content of the sites M_1 and M_3 as calculated from the analytical data. It has been assumed that the M_4 sites are occupied by sodium ions and M_2 by iron (III) ions in accordance with the suggestions of Ghose (1965).

The results obtained show that the band A at 3620–3624 cm^{-1} is common to all the specimens investigated. This is attributed to the hydroxyl group co-ordinated to (Fe Fe Fe) and the higher frequency bands B, C, D are caused by progressive replacement of Fe^{2+} by the less electronegative Mg^{2+}.

The B^* band of the New Hampshire riebeckite, fig. 1 (i), cannot, how-