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REFERENCES

- COHEN (E.), 1892. *Ann. Naturhist. Hofmus. Wien*, **7**, 146.
DOAN (A. S.) and GOLDSTEIN (J. I.), 1969. In MILLMAN (P. M.), *Meteorite Research*, 763. Reidel (Dordrecht).
HEY (M. H.), 1966. *Catalogue of Meteorites*, 3rd edn, Brit. Mus. (Nat. Hist.), London.
PALACHE (C.), BERMAN (H.), and FRONDEL (C.), 1944. *Dana's System of Mineralogy*, 7th edn, **1**, Wiley, New York.
PERRY (S. H.), 1942. *Photomicrographs of Meteoric Irons*, **3**, Adrian, Michigan.
— 1944. The Metallography of Meteoric Iron, *U.S. Nat. Mus. Bull.* **184**, Washington.
TAYLOR (W. J.), 1857. *Amer. Journ. Sci.* ser. 2, **24**, 293.

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Arsenates of copper from Shetland

ROSETTES of clinoclase were observed on a specimen, no. 2671, from the collection of the Royal Institution, Liverpool, now incorporated in that of the University of Liverpool (in which it is numbered 8859).

The clinoclase, together with patches of a dark green botryoidal mineral, encrusts one side of a slab of quartz, coated on the other with a pale green clay-like substance. A narrow vein bearing cuprite crosses the middle. X-ray powder-patterns showed the botryoidal mineral to be cornwallite, accompanied by cornubite of a paler colour.

The manuscript catalogue of the Institution's collection, drawn up by Dr. T. S. Traill, describes the specimen as 'green carbonate of copper with crystals of malachite. The first is earthy investing the rock. Fitfall Head, Zetland.' Traill toured Shetland in 1803, but in his published account does not mention copper as being found on Fitfall itself, though it was then being worked nearby 'at Quendal Bay,' probably on Garthsness.

The author is grateful to Dr. D. Flinn for making the specimen available for study.

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REFERENCE

TRAILL (T. S.), 1806. *Observations, chiefly mineralogical, on the Shetland Islands, made in the course of a Tour through those Islands in 1803* in NEILL (P.), *A Tour through some of the Islands of Orkney and Shetland*, Edinburgh, 157-73.

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The metal phase of the Bustee enstatite achondrite

WASSON AND WAI (1970) have recently evaluated the compositions of the metal phase and the associated schreibersite of eight enstatite achondrites and have defined a sequence among these achondrites on the basis of the Si concentrations in the metal. They have further examined the properties of both the enstatite chondrites and achondrites and have suggested the possibility that these objects can be considered to form a single evolutionary sequence. Among the nine enstatite achondrites listed in the Hey (1966) catalogue, Bustee is the only one not included in their study. Because of the aroused interest in the relationship between the enstatite chondrites and achondrites, it was desirable to find out whether Bustee fits into the suggested sequence or not.

We obtained a polished thin section of Bustee with a metal grain inclusion about 3 mm in diameter from the British Museum. A schreibersite inclusion of approximately $200 \times 300 \mu\text{m}$ in dimension was found in the metal grain. The metal grain and schreibersite were analyzed using an ARL-EMX-SM electron microprobe available at the Idaho Bureau of Mines and Geology. Results of probe analysis for Si, Ni, P, Co, Cu, and Cr in the metal grain and associated schreibersite of Bustee are given below; the standards used were alloys from the National Bureau of Standards having an equivalent matrix and minor amounts of Si etc.

	Si	Ni	P	Co	Cu	Cr
Kamacite	0.059 %	5.5 %	0.056 %	0.29 %	0.046 %	< 0.015 %
Schreibersite	< 0.010	40.1	15.3	0.088	0.067	< 0.014

The Si and Ni contents in the metal of Bustee fall between those of Pesyanoe (Si 0.58-0.05 %; Ni 5.2-3.7 %) and Khor Temiki (Si < 90 ppm; Ni 5.9 %) enstatite achondrites reported previously (Wasson and Wai, 1970).

If we define a sequence in the order of decreasing Si content in the metal phase for