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THE WEEKEROO METEORITE: A SIDERITE FROM SOUTH AUSTRALIA.

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(Plate xxxiii.)

This siderite was found in 1924 by Mr. James Lane at Weekeroo Station, Mannahill, South Australia (Lat. 32° 16' S., Long. 139° 52' E.). According to Mr. Lane, it was found "on the brow of a big hill resting on a quartz reef level with the surface."

It was a complete iron weighing 94.2 kg. (207½ lb.), of which the main mass, weighing 47 kg., is in the collection of the Australian Museum. It measured approximately 50 cm. by 27 cm. by 19 cm.

The external appearance is typical of a siderite, the characteristic "thumb-marks" being present. The iron was cut into two portions along the major axis. Considerable difficulty was experienced in completing this work, which was carried out by the New South Wales Government Railway Workshops at Eveleigh. This difficulty was the first indication that the siderite was of an unusual type, the cause of the trouble being the presence of numerous nodules of silicate minerals and troilite. The cut surface of the mass retained by the Museum was polished and etched with weak nitric acid, the section so obtained measuring 49 cm. by 19 cm., and containing 324 inclusions of troilite and silicate minerals.

A Rosiwal analysis carried out on this section gave as a result 96.23 per cent. of nickel-iron, 3 per cent. of troilite, and 0.77 per cent. of silicate minerals. This analysis showed also that the inclusions were fairly evenly distributed, being slightly more numerous in the centre portion than at either end. The results are as follows:

End portion	3.48 per cent. of inclusions
Centre portion	4.71 per cent. of inclusions
End portion	3.46 per cent. of inclusions
Whole section	3.77 per cent. of inclusions

The result of the etching revealed the fact that the iron is unique among recorded Australian falls. The surface contains numerous cracks which surround portions differently orientated, giving the iron a brecciated appearance. The iron in the different portions belongs to the broad octahedrite type. The troilite and silicate inclusions are mostly found along the cracks. The iron is therefore a brecciated octahedrite with silicate grains, and appears to belong to the Copiapo group (Obc) of the Brezina classification.¹ Brezina includes only one iron, the

¹ Brezina.—Annalen. des K.K. naturhist. Hofmuseums, x, 1895, pp. 232-307.

Copiapo, in this group. From the description and figure given by Haidinger² it would appear that the Weekeroo siderite closely resembles this iron.

For the purpose of analysis, thirty grammes of material were used, and the following results were obtained:

Fe	91.40
Ni	6.89
Co	0.46
S	1.02
P	Trace
C	0.01
Silicates	0.79
		100.57

The following is the mineral constitution of the iron calculated from the above analysis:

Nickel-iron	96.96
Troilite	2.81
Schreibersite	Trace
Carbon	0.01
Silicates	0.79
		100.57

The nickel-iron ratio is 12.2.

The residue left after solution with concentrated hydrochloric acid was examined under the microscope, and only one silicate mineral appeared to be present. It was found to vary in colour from pale green to white. The largest fragment obtained in this way was about 3 mm. in diameter, and, like the other fragments, very easily broke up into minute acicular crystals, which were arranged radially in the fragment; the lustre is pearly to vitreous and optically the mineral agreed with enstatite. Any olivine present would have been decomposed by the action of the acid, but the absence of silica both in the solution and the residue indicates that olivine was absent.

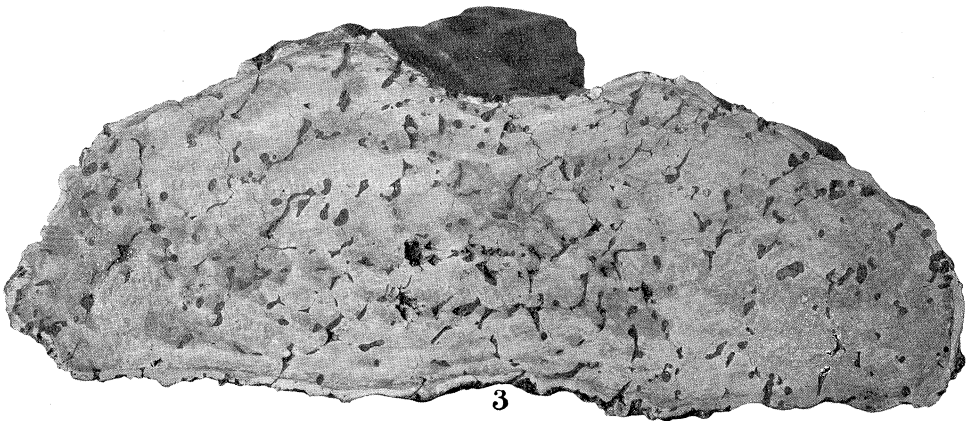
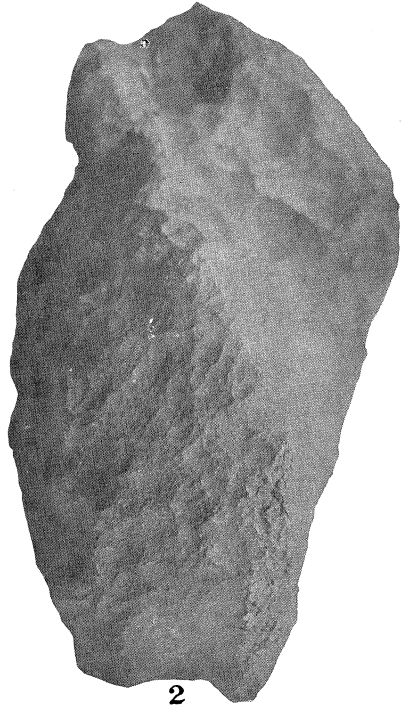
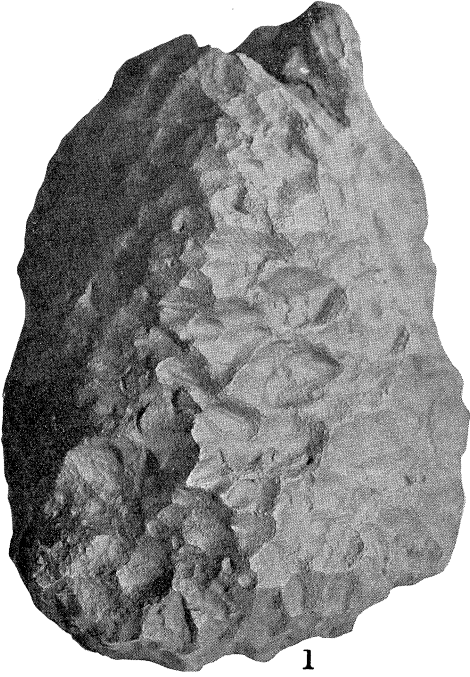
The carbon content was estimated by heating the insoluble in oxygen and estimating carbon from the CO₂ liberated in the usual way. The carbon is most probably in the form of graphite, of which extremely small black specks were seen under the microscope. A very little black material, which was soluble in aqua regia, was left after ignition. This material belonged to the platinum group of metals, but was much too small for exact determination.

EXPLANATION OF PLATE XXXIII.

Figs. 1-2.—Two views of the Weekeroo Meteorite before cutting.

Fig. 3.—Etched surface of the main mass of the Weekeroo Meteorite, showing nodules of troilite and silicate minerals. The brecciated nature of the iron is shown in the numerous cracks.

²Haidinger.—Sitzung Akad. Wiss. Wien. Math. naturwiss K., xlix, 1864, p. 490.



G. C. CLUTTON, photo.