A new meteoric stone from Silverton, New South Wales.

(With Plate XXIII.)

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UNFORTUNATELY nothing is known of the history of this stone. It was found in 1933 by Mr. R. Bedford in the old museum at Port Adelaide in South Australia. Attached to the specimen is a small label with the number 23, and accompanying it was a card giving in faded writing the information '(23) Meteoric stone from Silverton'. The Port Adelaide Museum has been in a neglected condition for thirty years, and recently it has been decided to reorganize it as a Nautical Museum, and to discard all mineral and miscellaneous material. The work of clearing up and rearrangement was undertaken by Mr. Bedford, and, the museum having no funds, he received in exchange for his services much of the discarded material for the Kyancutta Museum. The nice little meteoric stone was found by him buried in a heap of mineral junk and dust in one of the cases. It is now the property of the Kyancutta Museum in South Australia, which is actively administered by Mr. Bedford.

The period of greatest activity of the Port Adelaide Museum was between 1880 and 1890. The label accompanying the stone appears to be about that date, and no doubt the specimen was added to the collection sometime during that period. This corresponds with the time of the discovery of the rich ore-deposits at Broken Hill in the Silverton district, in New South Wales near the border of South Australia. Silverton (lat. 31° 53′ S., long. 141° 12′ E.) was surveyed and proclaimed a town in 1883, and Broken Hill was pegged out in the same year. The date of finding of the stone may then have been about 1883 or a few years later; but there is no definite information, and nothing is known of the fall of a meteorite in that district.

The stone was kindly sent by Mr. Bedford to the British Museum for inspection, with permission to cut off, if necessary, a portion for

examination, and he has generously allowed a fragment (32 grams) to be kept for the British Museum collection of meteorites.

It is a complete stone entirely covered with crust and showing no sign of fracture or damage. The delicate surface markings show very clearly the oriented flight of the stone through the earth's atmosphere. The stone must have been collected very soon after its fall. The

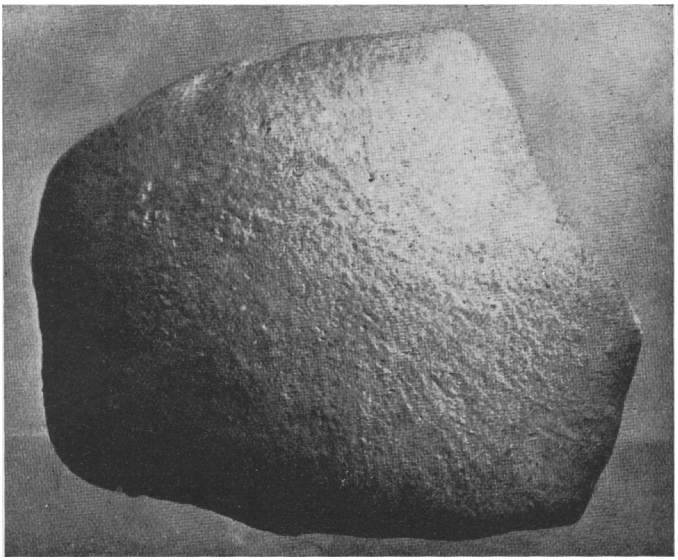


FIG. 1. Meteoric stone from Silverton, New South Wales. Photograph of the uncoloured plaster cast, showing the radiating streaks on the front surface. Same size.

general shape suggests a segment of a ball, which, if complete, would be about 10 cm. in diameter. The front spherical surface is smooth except for delicate streaks in the crust radiating from the centre. These streaks pass over the edges like a cascade, giving a line of a thicker blebby crust, and showing very clearly the flow of molten material from front to back. The back of the stone is bounded by three surfaces meeting in an apex which lies directly behind the centre of the front surface. One of these is flat with a thick blebby and corrugated crust. The two other surfaces are less even and have a thinner crust, which shows the blebby character only at the edges adjoining the front of the stone. These two are evidently later fractures while the stone was travelling through the air. Pittings

and 'thumb-marks' often seen on meteoric stones are not present. The dimensions across the front of the stone are 8·2 and 6·5 cm., and the thickness from front to back is 5·0 cm. In colour the stone is dull black with some indistinct dark brown patches. The weight was 350·73 grams (rather over $\frac{3}{4}$ lb.).

Before making a mould of the stone and weighing it in water, it was coated with a film of vinyl acetate, which has been found to be a good preservative for meteorites. Excellent casts were made by

FIG. 2. Meteoric stone from Silverton, New South Wales. Photograph of the actual stone; side view showing the flow of material from the rounded front towards the two back surfaces of later fracture. Same size.

Mr. F. O. Barlow. Fig. 1 is from a photograph of the uncoloured cast which shows rather more clearly the radiating streaks on the crust than would be shown by a photograph of the dark stone. Fig. 2 is a side-view photograph of the actual stone. The specific gravity of the whole stone was determined by hydrostatic weighing to be 3·31. This is, however, a low value for the material. The stone is somewhat porous, and when a fragment is immersed in water there is an escape of air bubbles.

The stone was easily cut with a diamond-charged slitting disk, giving a smooth surface. The metallic inclusions took a good polish, but the stony portion, although apparently compact, did not polish. A slice 1 mm. thick was then cut for the preparation of micro-sections, but this broke into pieces owing to the friability of the stone. Fragments readily crumble when rubbed between the fingers.

The section of the stone (plate XXIII, fig. 3) shows the dull black crust $\frac{1}{2}$–1 mm. thick, with no appreciable difference in thickness and character on the front and back surfaces. The crust is magnetic. Embedded in it are several particles of metal still showing jagged outlines and sometimes extending to the outer surface of the meteorite. There are also several small cavities with roundish or irregular outlines. Inside the crust there is an iron-stained zone up to $\frac{1}{2}$ cm. wide of a light brown colour. This represents a slight oxidation and rusting which no doubt took place under moist conditions between the time when the stone fell and when it was found. This could perhaps have been produced by a single shower of rain. Small iron-stained patches are also seen throughout the section, mostly around the particles of nickel-iron. The irregular distribution, small amount, and jagged outlines of the particles of nickel-iron are shown in fig. 4; the largest area measures 2 mm. across. Troilite is present as smaller and rounder grains. The stony portion is light grey in colour. Chondrules are to be seen, but they are not very conspicuous. They are white and usually round with a diameter of 1 to 2 mm.; the largest (not in the section figured) is oval, measuring $4\frac{1}{2} \times 3$ mm.

Micro-sections show a confused aggregate of broken crystals, mostly as fine particles, with some larger fissured crystals of olivine and enstatite (or hypersthene); also a few chondrules and fragments of chondrules of fibrous enstatite and of porphyritic olivine. Only a small amount of felspar is recognizable. The black crust is opaque.

The stone may be classed as a white hypersthene-olivine-chondrite of the Baroti type.[1] It is very similar to the stone seen to fall on March 9, 1923, at Ashdon in Essex.[2] In shape and surface markings it is also similar to the Ashdon stone, but about one-quarter the size.

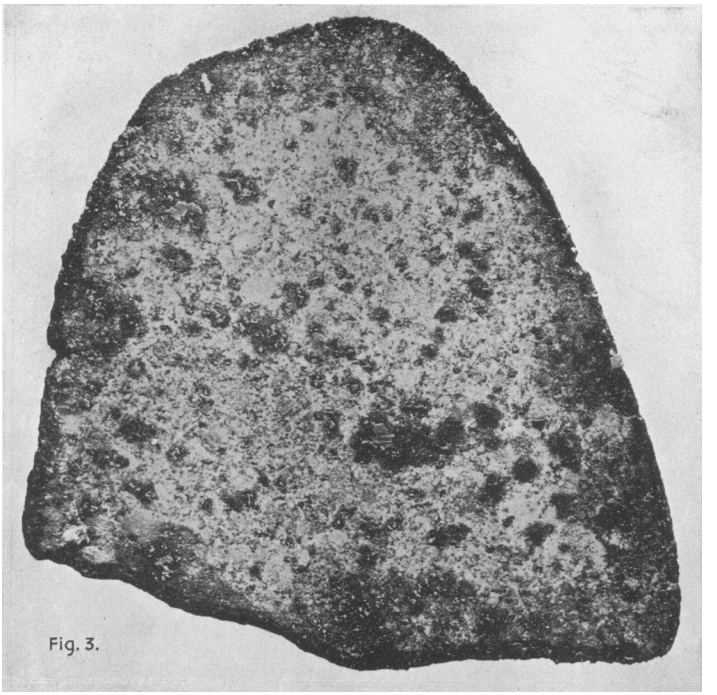
EXPLANATION OF PLATE XXIII.

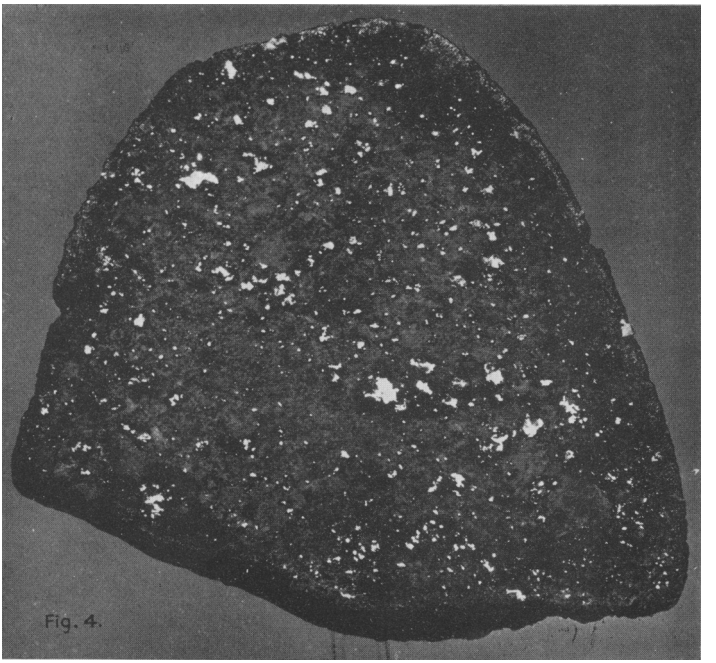
Section of the meteoric stone from Silverton, New South Wales. $\times 2\frac{1}{3}$.
The right-hand edge is the front of the stone.

FIG. 3. The stony portion in the reflecting position, showing the black crust and the chondrules.

FIG. 4. The same section photographed with the metallic particles in the reflecting position.

[1] G. T. Prior, Min. Mag., 1916, vol. 18, p. 30; 1920, vol. 19, p. 61.
[2] G. T. Prior, Min. Mag., 1923, vol. 20, p. 131.





L. J. SPENCER: METEORIC STONE, SILVERTON, NEW SOUTH WALES.