

Meteoric stones from Suwahib, Arabia.

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A METEORIC stone found in 1931 by Mr. Bertram Thomas at Buwah (lat. $20^{\circ} 3' 10''$ N., long. $51^{\circ} 25'$ E.) in the region of Suwahib in the Rub' al Khali, Arabia, has already been described in this Magazine.¹ In 1932, Mr. H. St. J. B. Philby, travelling on a route some miles to the west of that followed by Mr. Bertram Thomas, picked up meteoric stones at three other places. Two of these are between 25 and 30 miles to the west of Buwah, and the third, Umm Tina, 3 miles north of Shanna, lies about 70 miles to the south.

Like the stone from Buwah, all the three new finds are heavily coated with limonite and are in a much decomposed condition. The alteration is farther advanced than in the Buwah stone, and the recognition of the specimens as fragments of meteorites is not easy.

A brief description of the specimens is given below :

(1) Three fragments found on February 10, 1932, at 'Ain Sala (lat. $19^{\circ} 57' 20''$ N., long. $51^{\circ} 2'$ E.) 25 miles from Buwah. These pieces fit together, forming an ovoid stone bounded by nine surfaces, some of which are slightly convex, while the others are very slightly concave and almost flat. The weight of the three pieces together, including adhering sand grains, is 106.07 grams. Dimensions of the complete stone, $4 \times 3\frac{1}{2} \times 3\frac{1}{2}$ cm. A thin section shows the stone to consist of small and not very abundant chondrules in a matrix consisting partly of fragmental crystalline material and partly of limonite. The limonite occurs in minute patches, but also more abundantly in veinlets which traverse the whole stone. It is impossible to tell what proportion of the matrix originally consisted of nickel-iron or troilite. Only traces of these minerals can now be recognized, and it appears that their original amount was not very great.

¹ W. C. Smith, A new meteoric stone from Suwahib, Arabia. *Min. Mag.*, 1932, vol. 23, pp. 43-50.

The chondrules include both eccentric radiating chondrules of enstatite and porphyritic chondrules consisting mainly of olivine.

(2) A single fragment found on February 12, 1932, at Adraj (lat. $20^{\circ} 1' N.$, long. $50^{\circ} 56' E.$), $7\frac{1}{2}$ miles approximately WNW. from 'Ain Sala and 32 miles almost due west of Buwah. This is an extremely irregular fragment, weighing 118.14 grams, with many rough faces, and measuring along three directions at right angles $6 \times 5 \times 3$ cm. It is in a highly altered condition with deep cracks running inwards from the surface. A thin section shows it to consist of abundant very well-formed chondrules in a matrix permeated by limonitic veinlets and patches; many of the chondrules measure 1.5 mm. in diameter, but the average is near 0.4 mm. Both radiating eccentric enstatite chondrules and porphyritic and lamellated olivine chondrules are present. A polished surface examined with a vertical illuminator shows that the limonite completely masks any residual nickel-iron or troilite.

Except for their more advanced stage of decomposition this specimen and the fragments from 'Ain Sala closely resemble the stone from Buwah, which was referred to Prior's Cronstad type (a bronzite-olivine-chondrite).

(3) About a dozen fragments collected on February 20, 1932, at Umm Tina (lat. $19^{\circ} 1' 40'' N.$, long. $51^{\circ} 5' E.$), 3 miles north of Shanna well, and about 70 miles south of Buwah. The fragments

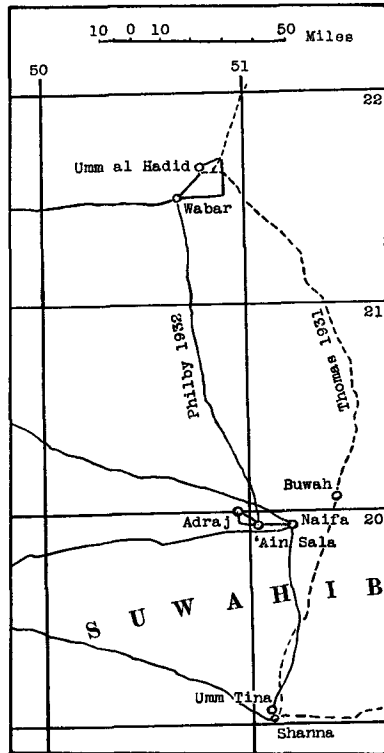


FIG. 1. Sketch-map showing localities of meteoric stones in the Rub' al Khali, Arabia.

Continuous line, Philby's route, 1932.
Broken line, Thomas's route, 1931.

Mr. Philby also collected meteoric iron at Wabar and Naifa.

evidently represent a single specimen, possibly shattered by a blow. Total weight 70.2 grams. Specific gravity 2.98. Like the others it is heavily coated with limonite, which also permeates the whole stone. A thin section shows a rather confused mass of chondrules, mostly coarse, fibrous, some porphyritic, and all deeply stained with limonite. The spherical forms of chondrules are not very marked, the chondrules being close packed and very numerous. Enstatite and olivine seem to be the main constituents. The amount of interstitial material is small, and it does not seem probable that much nickel-iron was present originally, though there are small opaque patches scattered through the section. It thus resembles the Baroti type of Prior (hypersthene-olivine-chondrite). The stone is weakly magnetic.

With such poorly preserved material it is not easy to make identifications with certainty, but the characters of the specimens seem to indicate that the fragments from 'Ain Sala and Adraj are similar to the meteoric stone from Buwah and may belong to the same 'shower', while the meteoric stone from Umm Tina seems sufficiently different to suggest that it belongs to a separate fall.

That all the stones were found near wells may suggest that they have been carried by Arabs and dropped here and there at halts by accident. On the other hand, it may be urged that only at halts would stones like these be noticed. There may be many others scattered over the area in which these fragments were found.

Mr. Philby is to be congratulated on the collection of this unpromising looking material, so insignificant in comparison with his meteoric iron from Wabar and all the unique products of its impact. The British Museum is indebted for these specimens to H.M. the king of the Hejaz and Nejd, by whom they have been graciously presented.
