THE BARTLETT METEORITE, BELL COUNTY, TEXAS

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HISTORY AND GENERAL FEATURES

The nickel-iron meteorite here described was obtained from Mr. Willard Wiederspahn, a student in the University of Texas, in the fall of 1938. He stated that it was ploughed up in a field by his father "about three years ago" and placed along a fence line.

The field is on the Molly Benson farm, 5 miles west of the town of Bartlett (Lat. 30°50′ N., Long. 97°30′ W.) in Bell County, Texas. While reading an article on meteorites in a popular magazine, Willard Wiederspahn recalled the "heavy black rock" on the fence line and when he returned to school in the fall of 1938 he brought it to the writer for identification. It is now in the museum of the Department of Geology at The University of Texas. Nothing is known regarding its fall.

The meteorite is roughly rectangular in outline with maximum dimensions as follows: $7\frac{1}{2}$ inches$\times 6\frac{1}{2}$ inches$\times 3\frac{1}{2}$ inches. The original weight was 8.59 kilograms (18.94 pounds). The specific gravity is 7.444. One edge is more or less rounded while the other is fairly sharp giving the mass, as a whole, a wedge-shaped appearance. One surface is covered by three broad shallow depressions (2 to 3 inches in diameter) while the opposite side has only one such depression (Fig. 1). Pits of small diameter but comparatively deep occur in the depressions, probably formed by the oxidation of troilite nodules. The surface is covered with a coating of oxidation products although several areas of the fusion crust (lower left on Fig. 1) are still visible on the rounded edge. The fusion crust is dull black, relatively smooth and contains many tiny flow lines visible with a lens. Several rather long scratch-like markings occur on the outer surface. These are exceptionally clear where they cut through areas of the fusion crust. In general they have oxidized more readily than the adjoining portions of the mass. These scratch-like markings are believed to be stringers of troilite which were more readily fused than the adjoining material.

STRUCTURE

The specimen was sent to the American Meteorite Laboratory, Denver, Colorado, where it was cut, polished, and etched. It was cut into two nearly equal parts and both surfaces were polished and etched. Two other cuts were made at right angles to the main cut, and to each other, in order to determine the best direction for the main cut and to obtain material for the chemical and spectographic analyses.

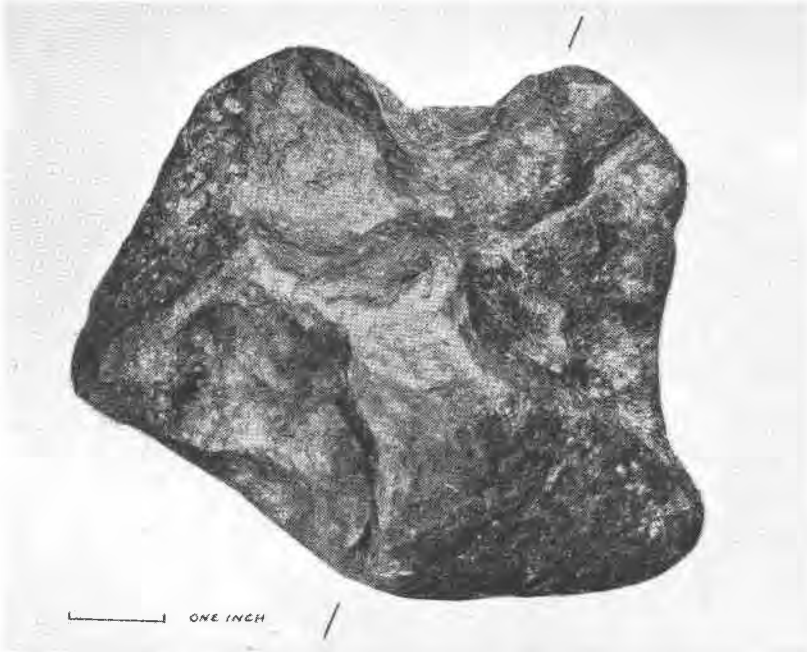

FIG. 1. The Bartlett meteorite.

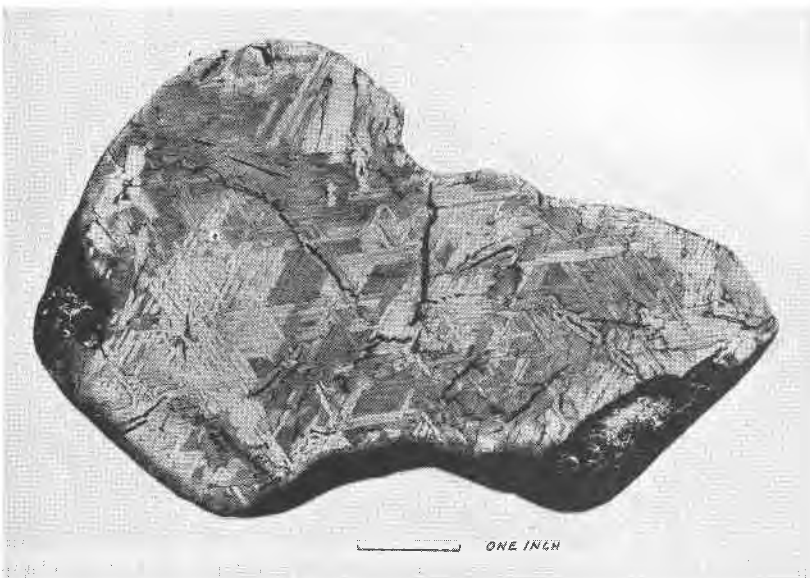

FIG. 2. Polished and etched section of the Bartlett meteorite (medium octahedrite) showing well developed Widmanstätten figures. The prominent plates are kamacite. The direction of the section is shown on Fig. 1 by the two short lines.

The etched surface shows well developed Widmanstätten figures with an octahedral pattern. They consist chiefly of grouped kamacite plates averaging about 1 mm. in width and varying from 1 to 2 cm. in length (Fig. 2). The structure is fairly uniform over the whole mass although in a few places the kamacite plates are much larger (up to 5 mm. in width) and more irregular in shape. In other places the kamacite plates are swollen with rounded ends.

The meteorite is classified as a Medium Octahedrite (Om).

Composition

Kamacite. In general the mass is composed of grouped kamacite plates averaging about 1 mm. in width and ranging from 1 to 2 cm. in length. The kamacite plates reflect light differently in various areas resulting in a somewhat spotted appearance in reflected light. Separating some of the well defined areas of grouped kamacite plates are more or less irregular bands of kamacite ranging up to 5 mm. in width. In a few places the kamacite plates are more or less rounded, or swollen, and of much smaller size.

Taenite. Surrounding each plate of kamacite is a bright, tin white ribbon of taenite. The bands of taenite are exceedingly small, averaging only a fraction of a millimeter in width. They have a wavy or zigzag appearance, conforming to the variations in width of the kamacite plates. The taenite also penetrates some of the kamacite plates resulting in a much finer structure within the bands.

Plessite. The fields resulting from the areas intervening between the intersection of the kamacite and taenite bands are very sparingly represented, the great majority of the mass being made up of lamellae of kamacite. The few areas present are usually roughly triangular in outline and are filled with dull grayish plessite, surrounded by bands of bright taenite. Most of the plessite areas are less than a millimeter in their long dimension, although a few are larger.

Schreibersite. This mineral is not abundant although a few characteristic areas are present. It occurs in long narrow bands (dark bands in upper right of Fig. 2) having an average width of about 1 mm. and a maximum length of 2 cm. In addition small irregular masses or grains are scattered through the section, ordinarily within bands of kamacite.

Troilite. The troilite occurs as small spheroidal nodules scattered irregularly throughout the meteorite. In general the troilite nodules are in bands of schreibersite. The nodules have been badly decomposed on the polished and etched surface by the acid used in etching. In general, the nodules do not exceed 1 mm. in diameter. However, the polished section cuts through a cavity of irregular outline with a maximum diameter of 1 cm. (extreme left of Fig. 2) which appears to have resulted from the solution of a nodule of troilite. Also a number of pit-like depressions are present on the outer surface, one with a diameter of 1.5 cm. suggests a cavity formerly filled by a troilite nodule. The absence of sulphur in the chemical analysis would indicate that the sample submitted for chemical analysis did not include a troilite nodule.

Lawrencite. The tendency of streaks and fracture lines to rust badly on the polished section together with a trace of chlorine in the analysis suggests the presence of lawrencite.

A chemical analysis of the Bartlett meteorite was made by Dr. F. A. Gonyer and is given below.

Fe	90.41%	
Ni	8.88	
Co	0.47	
P	0.22	
Cu	none	
Cl	trace	
S	none	
Mn	none	
	99.98%	
Fe_2O_3	1.21	(Scale which was deducted from weight of the sample before calculating the analysis.)

A spectographic analysis of a sample of the Bartlett meteorite, made by Dr. H. A. Wilhelm, is as follows: Fe[1], Ni[2], Co[3], Ge[4], Cu[5], Si[5]. Intensities: [1] strong, [2] present, [3] weak, [4] trace, [5] faint trace.

Acknowledgments

The chemical analysis was made by Dr. F. A. Gonyer of the Department of Mineralogy and Petrography of Harvard University. The spectrographic analysis was made by Dr. H. A. Wilhelm of the Department of Chemistry of Iowa State College. The writer is indebted to Professor F. L. Whitney and Mr. Blake Cockrum of the Department of Geology of The University of Texas for assistance in the photographic work. The cutting, polishing, and etching was done by Mr. H. H. Nininger of the American Meteorite Laboratory, Denver, Colorado.

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