ART. XVIII.—*Notices of New Meteoric Irons in the United States* ; by CHARLES UPHAM SHEPARD.

1. *Meteoric Iron from Auburn, Macon county, Alabama.*

IN October last, Prof. J. Darby, of the East Alabama College, forwarded to me by mail at Amherst, about twenty grains of what he suspected to be meteoric iron, with the desire that I would subject it to examination. He stated in his letter that the fragments had been detached from a mass weighing about eight pounds that had been ploughed up in his neighborhood many years since, but which until lately had been overlooked in his collection. He described the mass as consisting of agglutinated irregularly shaped concretions, presenting the appearance of having from a previous state of separation, been suddenly compressed together into a single rounded mass.

A partial examination induced me to believe the fragments sent to be of meteoric origin; and led to a correspondence with Prof. Darby, which resulted in his placing one half the mass, weighing four pounds, at my disposal, accompanied with the following more complete history of the discovery :

“The man who brought the mass to me (and who was its discoverer) had taken it, without my knowledge, to a blacksmith’s shop, where in the cold state it was broken in two upon an anvil, by means of a sledge hammer. Originally, it must have been nearly globular in form. The surfaces produced by the separation had, when I received the specimen, a metallic luster. The finder made known to me the exact spot where he had ploughed it up. It was on what is known as the Daniel plantation, about three-quarters of a mile west of our college building, and near the eastern edge of a field, just across a branch (small stream). I have searched in the region for other specimens without effect, but have instructed the negroes to bring to me any thing unusual they may hereafter discover. The name of the man who found the mass and his present residence are unknown.”

On receiving the half of the mass I was at once struck with Prof. Darby’s first description of its appearance. The surface of fracture, or separation, is coarsely granular, exhibiting large irregularly shaped concretions, which show only obscurely, traces of octahedral cleavage. The former metallic luster is now replaced by a rusty brown film ; while numerous cracks or chinks are observable, not merely separating the concretions but often traversing the mass of each individual. Indeed the entire specimen is thus cracked up and subdivided by these open veins, as if it had been shattered by striking when in a semi-fused state, against a rock, at the time of its fall. So imperfect is the cohesion at present that it would not be very difficult to break it into pieces, (from the size of a large pea up to that of an almond) by vigorous blows from a sledge-hammer. Some of these concretions are partially stalactitic, tuberoso or sub-mammillary, as if a secondary softening or fusion of the iron had taken place at the time of its descent. This structure is altogether peculiar for a meteoric iron, though not unknown in native copper and silver.

The larger concretions have a slight tendency to separate into smaller ones of the size of peas, whose figure, however, is that of the granular individuals of magnetite and pyrites, except perhaps in having a tendency to an elongation in the concretion which occasionally passes into the sub-columnar structure.

One single globule of troilite (sulphid of iron), half an inch in diameter is visible upon the fractured surface of the mass. It is compact in structure, and yellowish-brown in color.

As yet I have not been able to have any portion of the mass regularly slit and polished ; but a surface of one of the larger compound concretions, on being ground upon its broader side and polished, afforded me an area of half an inch square. This face, on being subjected to the action of dilute nitric acid, gave me a series of markings altogether new. They are extremely fine and delicate in their dimensions, and require a strong light with the aid of a microscope, to be seen with distinctness. The first character that displays itself is somewhat that of a mesh or net-work, and arises from the polygonal boundaries of the granular concretions. The areas within these lines or edges (which are exceedingly thin) have a glittering luster when held at a fixed angle to the light, though this angle often varies for different concretions, as in the case of a polished surface of coarse grained calcite or fluor. The second character that arrests attention in the examination, is the finely striated surface of each concretion,—one set of lines being perfectly straight and equidistant, as in calcite and labradorite, while a second set, but less distinct, cross these at right angles. The final peculiarity of the markings consists in this,—that these fine striæ are wholly made up of dots or beads, which are arranged in almost absolute contact, and are therefore to be regarded as consisting wholly of sections of rhabdite needles, while on the other hand, the mesh-like markings first noticed, are composed of plates of schreibersite.

From the foregoing it is apparent that the Auburn iron, when etched, is unlike any other hitherto described. But before a complete account can be given of its internal structure, an opportunity must be had of making further observations upon slices properly prepared from different portions of the mass.

The specific gravity, as obtained from four fragments, varied from 7·0—7·17, and gave 7·05 as the mean.

The iron is apparently free from chlorine. It dissolves in hydrochloric acid without extrication of sulphuretted hydrogen ; and leaves behind a slight residue of thin brilliant, blackish scales and needles. The following result was obtained on about two grams weight of the iron :

Iron,-----	94·580
Nickel,-----	3·015
Phosphorus,-----	0·129
Insoluble,-----	0·523
Chromium, } and loss	1·753
Magnesium, }	
Calcium, }	
Silicon, (?) }	
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	100·000

Inasmuch as the iron analyzed was slightly enfilmed with oxyds, that, in the results obtained, had to be calculated back to the metallic state in common with the oxyds coming from the pure metals, a trifling part of the loss in the analysis should go to increase the iron and nickel above given.

The composition of the troilite, schreibersite and rhabdite in the mass is too well known to render necessary any attempt to analyze them in the present case. Neither cobalt, tin, nor copper was detected in this iron.

2. Meteoric Iron from Southeastern Missouri.

For my knowledge of this iron I am indebted to Prof. B. F. Shumard, of Saint Louis, who sent me a specimen of it several years ago, but through an accident it failed to reach me until lately. He wrote me under date of Nov. 4, 1868, as follows: "The specimen is from one in the collection of the St. Louis Academy of Sciences which I found among minerals that belonged to the old Western Academy of Sciences, of St. Louis. The label with it gives only '*S. E. Missouri*' as the locality. Its meteoric character was not known until I examined it."

In reply to my request for further information, Prof. Shumard has favored me (Dec. 18) with the following additional particulars: "The specimen in the Academy's collection is irregularly lozenge-shaped, $3\frac{2}{16}$ inches long, $1\frac{1}{2}$ wide, and $1\frac{1}{16}$ thick. The extremities and upper face are rough and irregular, one lateral piece is smooth with a wavy surface, the other has been cut to supply specimens to Prof. Silliman, Haidinger and yourself. The under side is rough near one end, while the remainder of it has been smoothed by hammering. The specimen bears the appearance of having been heated. Its present weight is nine ounces; and if you will add to this what has been taken to furnish the specimens referred to above you will probably not be far from the truth, in calling the original weight twelve ounces. Nothing has been published concerning the specimen. I discovered it in the museum of the Academy during the year 1863."

In respect to the figures developed by etching, it belongs to my order of megagrammic irons; and most resembles those of Arva and Cocke county. It is rich in schreibersite, insomuch that when long acted upon by acid, this mineral projects in thick laminae above the surface, resembling mica on certain weathered coarse grained granites. The bars and spaces which are intermediate, however, are not traversed by those delicate lines of the same substance, so generally occurring in other irons.

Specific gravity 7·015—7·112. It appears to contain no chlorine. It gave :

Iron,	92·096
Nickel,	2·604
Schreibersite,	5·000
Chromium, cobalt, magnesium, phosphorus,	traces.
A fine residue of Fe Si and C. Neither copper nor tin was found.	

3. *Composition of Meteoric Iron from Losttown, Cherokee Co., Georgia.*

My general description of this iron was contained in vol. xlv, p. 257 of this Journal. Its analysis has afforded me—

Iron,	95·759
Nickel,	3·660
Insoluble (schreibersite and rhabdite,)	0·580
Chromium, cobalt, tin (?), magnesium,	traces.
Charleston, S. C. Dec. 29, 1868.	