

Presented by

Mrs. J. Lawrence Smith,

To.....

ORIGINAL RESEARCHES
IN
MINERALOGY AND CHEMISTRY.

J. LAWRENCE SMITH.



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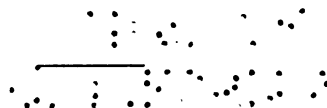
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STEWART COUNTY (GA.) METEORITE.

(FELL OCTOBER 6, 1869.)

Amer. Jour. Science, 1, 1870, pp. 339-341.

In October, 1869, I learned through the public press that certain meteoric phenomena had occurred in Stewart County, Georgia, and that one or more stones had fallen. Inquiries were immediately instituted by me, and through Prof. Willet I obtained for examination the only stone found, one that was seen to strike the ground.

The stone, as it reached me, was nearly intact, and weighed twelve and a quarter ounces; it must originally have weighed twelve and a half ounces. It is of an irregular conical shape, having a flattened base, and is covered with a dull, heavy black coating. The specific gravity is 3.65. The fractured surface has a grayish aspect, and when examined closely, especially by the aid of a glass, exhibits numerous greenish globules with a whitish granular material between; through the mass are dark particles consisting principally of nickeliferous iron, with some pyrites and a few specks of chrome iron. The nodules are sometimes three or more millimetres in diameter, and of an obscure fibrous crystalline structure, the crystals radiating usually from one side of the nodule; they have a dirty bottle-green color, a greasy aspect when broken, and are more or less opaque.

Some of these little nodules were separated in a tolerable state of purity, amounting to one hundred and twenty-one milligrammes. On analysis they afforded:

		Oxygen.	Ratio.
Silica	48.62	25.90	}
Alumina	8.05	3.79	
Protoxide of iron.....	11.21	2.51	}
Magnesia	30.18	11.80	
	98.06		

The hardness of the mineral is about 6, and it is quite tough. The formula would be R Si , with a part of the silica replaced by alumina, a not unfrequent case in minerals such as hornblende, hypersthene, etc. As it is impossible to derive any light from its crystalline structure, the above analysis warrants me in concluding that it is either *bronzite* or *hornblende*, but I am more inclined to the former supposition, as it appears to take the place of the enstatite in many meteorites.

Nickeliferous iron constitutes about seven per cent of the mass, and a portion separated in as pure a state as possible afforded on analysis.

Iron	86.92
Nickel	12.01
Cobalt75
	99.68

These are the proportions after allowing iron for a small amount of sulphur present in a minute quantity in the nickeliferous iron, which could not be separated mechanically. I did not test for copper or phosphorus. The quantity of iron separated from the stone did not warrant my making special analyses for substances the quantity of which present could only be exceedingly minute.

The stony matter freed from the iron was treated with nitromuriatic acid and water, and heated for some time over a water-bath, renewing the water and acid once or twice; the solution was filtered, and the residue washed; the residue was then treated with a warm solution of caustic potash, filtered, and again washed. The filtrate was neutralized by hydrochloric acid and added to the first filtrate, and the whole evaporated to dryness over a water-bath, warmed gently over the lamp, and treated with water and a little hydrochloric acid, thrown on a filter, the silica collected and estimated; the last filtrate was treated with a solution of chloride of barium to ascertain the quantity of sulphuric acid present (due to the pyrites in the original mass); it was found to indicate 6.10 per cent of magnetic iron pyrites. The solution freed from the excess of baryta was now analyzed in the ordinary way.

The insoluble portion of the meteorite was fused with carbonate of soda and a small fragment of caustic potash, and its ingredients ascertained.

A separate portion of the stony part of the meteorite was examined for alkalies.

The various analyses referred to above gave, omitting the nickeliferous iron :

The part soluble in acid	58.05	
The part insoluble in acid	41.95	
	Soluble part.	Insoluble part.
Silica	41.08	56.03
Alumina32	5.89
Protoxide of iron	18.45	15.21
Magnesia	41.06	21.01
Lime10
Soda, with a little K and Li		2.97
	100.83	101.20

The soluble part consists principally of olivine. The insoluble is doubtless the bronzite already referred to, with a little albite or oligoclase.

Chrome iron was detected by fusing some of the stony part of the meteorite with carbonate of soda and a little niter and separating in the usual way. The quantity was quite minute. The composition of the stone as made out would be

Nickeliferous iron	7.00
Magnetic pyrites	6.10
Bronzite, or hornblende	} 86.90
Olivine	
Albite, or oligoclase	
Chrome iron	
	100.00

PHENOMENA ATTENDING THE FALL OF THE STONE.

Mr. J. B. Latimer, of Bladen's Creek, Stewart County, has kindly furnished the following particulars of the *flight* of the body through the air, and of the several *explosions*, which occurred nearly vertically above him :

“The morning of the sixth of October last (1869) was quite clear, scarcely any cloud being visible, quite calm ; about ten A. M. the atmosphere grew somewhat hazy, no clouds ; at about fifteen or twenty minutes before twelve M. a roaring, rushing sound was heard in a northwesterly direction, about 80° above the horizon. In a moment or two it was almost directly overhead, at which point a loud explosion occurred, followed in rapid succession by six other reports, but less in volume than the first—making seven in all. The explosions appeared about as loud as a twelve-pound cannon at a distance of ten or twelve miles. These explosions did not

occur all at the same point in the heavens, but seemed to emanate from some body moving rapidly to the southeast. After the explosions a peculiar whirring sound was heard, apparently produced by some large irregular body moving very rapidly. This also went in a southeasterly direction. This sound was heard several seconds; many have compared it, and aptly too, to an imperfect steam-whistle. I have no precise idea of the time consumed in all this demonstration. Some persons say several minutes, but I think ten or fifteen seconds would about cover the time.

“As the larger body was going out of our hearing, some moments after the explosions, a smaller one passed to the southwest with just such a noise as is always produced by a flying fragment of a shell after its explosion, or of any angular body cast violently through the air. This piece descended to the earth, distinctly traced in its passage by many persons, and struck in the yard of Capt. E. Barlow—which point of contact is, on an air-line, about two and a half miles from a perpendicular beneath where the explosions occurred. This is the only one known to have fallen in this section.

“The explosions, together with the rushing sound afterward, were heard over a region about thirty miles northeast and southwest, and fifty or sixty miles northwest and southeast. No shock was felt—at least no tremor of the earth.

“Two men say that they were looking in the exact direction of the explosions at the time they occurred and saw a quantity of vapor, much like the volume of steam escaping from the pipe of an engine at each successive stroke, which vapor or mist was violently agitated and increased in bulk with each successive report, but disappeared soon after the cessation of the reports. This corroborates the testimony of some of my own laborers, who say that immediately after the explosions something like a thin cloud cast its shadow over the field they were in.”

Hon. John T. Clarke, of Cuthbert, Ga., who has interested himself in collecting the history of the meteorite, and through whose influence it has come into the possession of Mercer University, writes me the following particulars of its *fall*:

“It fell about 11.30 A.M., on the sixth of October last (1869), in Stewart County, Georgia, on the premises of Elbridge Barlow, Esq., about twelve miles south of west from Lumpkin. Captain Barlow picked it up a few moments after it fell. His account of it

is this: While standing in the open yard, the sky being bright and clear, he heard first a succession of about three explosions, resembling bursts of thunder or discharges of artillery, followed by a deep roaring for several seconds, and then by a rushing or whizzing sound of something rushing with great speed through the air near by. The sound ceased suddenly. The noise from first to last was some half a minute. Two negroes were washing near the well in the same yard, about sixty yards from where Barlow stood. They heard the noise, and supposed it to be the falling in of the plank well-curbings, banging from side to side in its descent, and so spoke of it to one another before it fell. While they were speaking thus it struck the ground about twenty steps from them, in full sight, knocking up the dirt. They called Captain Barlow, and showed him the spot. It was upon very hard-trodden ground in the clean open yard. The earth was freshly loosened up very fine in a circle of about one and a half feet in diameter; and, upon scraping the loose dirt away with the hands the stone was found about ten inches below the surface. From the direction in which the ground was crushed in it must have come from the northwest, and at an angle of about thirty degrees with the horizon. The stone when it was picked up was covered all over with the black shell which it bears now, except a triangular spot on one corner, about one inch each way, where the corner appeared freshly knocked off, and about four other spots near a quarter of an inch in diameter, where the shell was slightly knocked off. The other bruises which you will find upon it have been made since by persons who have handled it. To enable you to distinguish the original breaks upon it I have marked each of them with a red cross. The stone still has a strong odor, which I will not undertake to describe. Captain Barlow says it smelled stronger when he first picked it up. He does not remember that it had any noticeable heat. It was not cold, as a stone found so deep in the ground should be.

“The stone weighs now twelve and a quarter ounces; about half an ounce has been pecked off from it. Its color within is strikingly like very light granite; and with the exceptions above noted it is entirely covered with a smooth, almost black shell, a trifle thicker than common letter-paper, so that externally it looks very much like a lump of iron ore. It is an irregular, seven-sided figure, its longest side being about two and three quarters inches long. If put into a spherical form it would make a ball about one

and three quarters inches in diameter. So far as I have been able to ascertain no other parts have been found.

“The noise attending this phenomena is variously described by different persons, and from different places. Two intelligent ladies, residing four miles south of Lumpkin, nearly east of where the stone fell, and about ten or twelve miles off, describe it thus: While sitting in the house they heard, as it were, the sound of a great fire suddenly bursting forth from some confinement into the open air. They rushed out of doors and heard the roaring sound continue for several seconds. They located the source of the noise in the direction of Barlow’s.

“In Cuthbert, about eighteen miles from Barlow’s, nearly southeast, a gentleman engaged in a workshop heard a lumbering noise, which he took to be several heavy pieces of machinery in an adjoining room falling down one after another. On going in he found no one, and that he had mistaken the cause of the noise. Many persons here heard sounds like repeated thunder followed by roaring. Some say that they first heard several rapid, cracking explosions, like that of volleys of small arms, followed immediately by the louder burst of artillery. Most persons here thought the noise came from the southeast, passed over the place in a northwesterly direction, and died away in the distant northwest.

“The foregoing statements have been selected from many in circulation, showing how differently the senses were affected at different points. The facts are purposely presented in their nakedness. If you can find them available in aid of a scientific investigation of the origin of this phenomenon, I shall have accomplished more than I expect.”

The above accounts agree as to the main facts: the point of greatest discrepancy—the direction of flight. It is probable that the meteorite came from some point in the *north* quarter; the statement of Mr. Latimer, over whom it exploded, and that of Mr. Barlow as to the direction in which the earth was penetrated, concur in this regard. Persons in Cuthbert, who represent it as coming from the south, may have been misled by an echo, mistaking this for the original sound.

