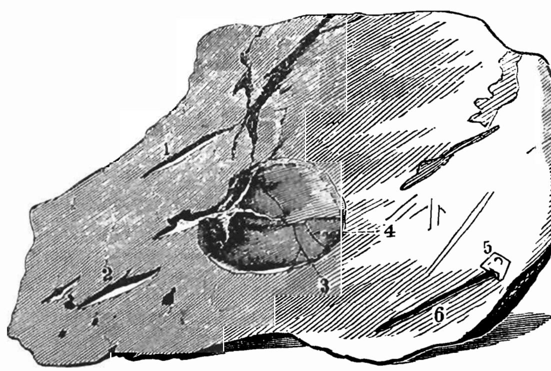
ART. XIII.—*A description of the Victoria Meteoric Iron, seen to fall in South Africa in* 1862, *with some notes on Chladnite or Enstatite;* by J. LAWRENCE SMITH, Louisville, Ky.

THE Victoria Meteoric Iron, although found about ten years since, has never been described; and yet it is one of the most interesting of this class of metorites. I have succeeded in collecting the following facts in connection with it. It was seen to fall in the year 1862 by a Dutch farmer in Victoria West, Cape Colony, South Africa, and was given by him to Mr. Auret the Civil Commissioner of that district, who presented it to the South African Museum at Capetown.

Although it is an iron which has a tendency to decompose rapidly, it has not undergone the decomposition that would have inevitably taken place had it long remained exposed to atmospheric influences. This fact, coupled with another that the farmer could have no object to deceive any one with reference to a body which certainly bears evidence that it fell at some time from the heavens, and as those who know the farmer have every confidence in his statement, we are led to conclude that it is to be placed along side of the Agram, Brannau and Dickson county irons. The mass was pear-shaped, and weighed about 6 lbs. 8 oz. One end was smooth and rounded; the smaller end was jagged as if torn or parted from a larger meteorite.



A small fragment of it was first brought to Europe in 1868, by which its true meteoric character was established. In 1870 the trustees of the South African Museum had it cut, retaining one half of it, and sending specimens to the British, Calcutta, Vienna and Berlin Museums, also to Mr. Nevill of Godalming, and a mass weighing about twelve ounces to myself.

From the specimen in my possession I here describe its characteristics. The iron is compact, with a tendency to fissure near some portions of its surface. The amount of oxide on the surface is small, the cut surfaces showing bright metal quite up to the exterior surface. The Widmannstättian figures developed are of that class where the lines are delicate and straight, inclined at a considerable angle to each other, a form I have seen common to irons rich in Schreibersite. This last mineral is diffused through the iron in masses with absolutely straight boundaries, some of them $\frac{5}{8}$ to $\frac{3}{4}$ of an inch long by $\frac{1}{8}$ of an inch broad (1 and 2 on figure), and others much longer (6) and narrower, others again triangular (5) and arrow-shaped; and on my specimen a layer of it (3) coating an oval cavity that must have been an inch and a half in its longest, and one inch in its shortest diameter, the Schreibersite having a thickness of about $\frac{1}{20}$ of an inch; the rest of this cavity being filled by pyrite (this is distinctly seen in the photograph). My specimen shows one fourth of this cavity and there are doubtless others in the original mass. The specific gravity is 7·692. On analysis it was found to contain:

Iron,	88·83
Nickel,	10·14
Cobalt,	·53
Copper,	minute quantity.
Phosphorus,	·28
	99·78

Enstatite or Chladnite.—This mineral now occupies so important a relation to the mineral constitution of meteoric stones that it is well to give an account of its discovery, and the subsequent investigations of different observers. Its discovery is beyond doubt due to Prof. C. U. Shepard, who first described it in the American Journal of Science, Sept., 1846, p. 381, calling it chladnite.

It constituted nearly the entire mass of the Bishopville meteorite that fell in 1843. Prof. Shepard did not make out its composition correctly, his analysis being imperfect. The composition given by him was

Silica,	70·41	3 of oxygen.
Magnesia,	28·25	1 " "
Soda,	1·39	

making it out to be a tersilicate of magnesia. Although the constitution was incorrectly determined, Prof. Shepard clearly showed that it differed in character from any then known mineral.

Eight years after the mineral was first made known, a small fragment of the meteorite coming into my possession, a reëxamination was made of its chemical constitution, and the errors of the first analysis discovered. But not having enough of the meteorite for analysis, the simple statement was presented to the American Association for the Advancement of Science in April, 1854, "that from some investigations just made, chladnite is likely to prove to be a pyroxene." This was noticed in the Proceedings of the Association for that year, and referred to in the American Journal of Science, March, 1855, p. 162. Ten years later a specimen of the Bishopville meteorite of good size being placed at my disposal, the mineral was separated in a very pure state and found to be composed as follows:

Silica,	59·97
Magnesia,	39·33
Peroxide of iron,	·40
Soda with feeble potash and H,	·74
	100·44

The minute quantity of peroxide of iron came from a little metallic iron that was present. The analysis afforded the oxygen ratio 2 : 1, corresponding to the formula $\dot{M}g^3, \dddot{S}i^2$ (or $\dot{M}g\ \dddot{S}i$,) corresponding to the general formula of pyroxene. The details of the examination then made, are to be found in the American Journal of Science, Sept., 1864, where it is further stated that chladnite approaches those forms of pyroxene known as white augite, diopside, white coccolite, &c., these last named minerals having part of the magnesia replaced by lime. It is identical with the enstatite of Kenngott, a pyroxenic mineral form Aloysthal in Moravia.

From these observations it will be seen that the Bishopville meteoric stone, however different in external characteristics from other similar bodies, is, after all, identical with the great family of pyroxenic meteoric stones.

Enstatite.—This form of pyroxene was first noticed by Kenngott as a new species, in a communication made by him to the Vienna Academy in 1855, (see Vien. Acad. Ber., xvi, p. 162, Jahresbericht for 1855, p. 928.) Its composition there given is—

Silica,	57·09
Alumina and oxide iron,	5·13
Magnesia,	35·85
Water,	1·92
	99·99

As the crystallographic character of this mineral entitles it to separation from pyroxene, or in other words, as it is entitled to be ranked as a new species, the prior right of discovery belongs to Prof. Shepard, and the name first given by him, chladnite, has the priority; but as it has for so long time borne the name of enstatite among minerologists, any attempt to change it would only bring confusion. This is the more to be regretted, since the name of Chladni would be a most appropriate affix to a mineral, the true and pure type of which is so preëminently that in meteorites.

In this connection I would refer to the simple chemical relation of three of the most characteristic minerals of meteoric stones; these minerals forming at least 90 per cent of the earthy minerals in the aggregate mass of all meteoric stones. The three minerals are:

Enstatite,	$\dot{R}\ \dddot{Si}$	$\dot{Mg}\ \dddot{Si}$.
Bronzite,	$\dot{R}\ \dddot{Si}$	$(\dot{Mg}\ \dot{Fe})\ \dddot{Si}$.
Chrysolite,	$\dot{R}_2\ \dddot{Si}$	$(\dot{Mg}\ \dot{Fe})\ \dddot{Si}$.

In these minerals, the protoxide of iron replaces but a small portion of the magnesia in the last two; so they are virtually silicates of magnesia containing one or two atoms of silica with one atom of magnesia.