AN UNUSUAL IRON METEORITE FROM MEXICO.

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In his catalogue of 1904 Ward lists an iron meteorite from Tlacotepec, Dt. Tecamachalco, State of Puebla, Mexico. This meteorite is credited with a weight of 24 kgs. (53 lbs.) and is referred to as octahedrite. This reference seems to have been the authority upon which such a meteorite is included in subsequent catalogues by Farrington and Prior; but so far as I have been able to learn nothing else has been written upon this meteorite from direct observation.

While studying the meteorites in the collection of the National Institute of Geology in Mexico City we made an effort to find such a specimen. There was none to be found. However, we did find a mass weighing 34 kgs. which bore the name Tlacotepec etched deeply upon its polished surface. It had evidently been cut from another mass which lay beside it and whose polished face conformed exactly to it. The second mass weighed 36.6 kgs. Together these two masses made a complete individual except for a small slab which had been removed from one end of the larger half. It appeared that the portion removed could not have weighed more than 200 grams, probably less.

No one in the Institute knew when nor by whom the cutting of this specimen was done. But since it bore the unmistakable label "Tlacotepec" etched upon its surface there could, of course, be no other conclusion than that it came from that locality.

The etching seemed to have revealed no crystalline structure but it had been etched rather deeply and I thought it worth while to try etching the other half, permission for which was kindly granted. A brief treatment with dilute HNO_3 gave a very unusual pattern on a part of the surface while in other parts nothing at all seemed to appear save some etching pits. The tendency was for the pattern to disappear or grow fainter with prolonged treatment and the entire polished surface gradually grew darker.

Exchanges were arranged so that one of the masses could be brought to the Nininger laboratory for further study.

Five slices were cut from the mass which proved to be very compact and difficult to cut, an average of 150 hours being required for the cutting of each slice measuring about 16 in. by $7\frac{1}{2}$ in. The five cuts revealed a remarkably uniform struc-

ture throughout the mass. Only a few small, circular nodules of troilite and numerous minute angular masses of the same, few of which measured more than a millimeter in the largest dimension. Subsequent treatment with acid proved that the troilite of these minute inclusions dissolves more readily in dilute HNO_3 than does that in the circular nodules.

Fig. 1. External view of Tlacotepec with one end removed.

Around the edges of each slice was an incomplete margin of dark bronzy material of very irregular width that seemed to have resulted from exposure to the elements. A test proved that this material possessed a small amount of magnetism. No chemical analysis was made of this constituent but it is considered to be magnetic. In one slice was found embedded a small spherical transparent inclusion of yellowish color which appeared to be olivine.

Upon etching, Tlacotepec developed a remarkable pattern in certain areas unlike that of any meteorite which it has been my privilege to see. The accompanying photograph will describe it better than words. In some respects it appears like a coarse octahedrite; but the three nickel-iron alloys—kamacite, taenite and plessite are entirely undifferentiated and instead of the usual hatching of lamellae the crystalline nature of the patterned portion is indicated only by its lively orientation and its very distinct angular outline. In certain other places there is a slight suggestion of a lattice-like structure but even here the structure does not closely resemble the typical crystalline

meteorite. The outlines of the pattern more nearly resemble the Neuman lines than the Widmanstätten figures. In places lines resembling Neuman lines continue out from the figures through the otherwise structureless metal in which, after a few centimeters, they fade out.

The only indication of schreibersite found in the 3,500 square centimeters of surface examined were minute, almost microscopic, rods of glistening material scattered more or less abundantly over the face of a slightly etched slice. With protracted etching these little masses were loosened and in attempting to remove the decomposition products with a brush or

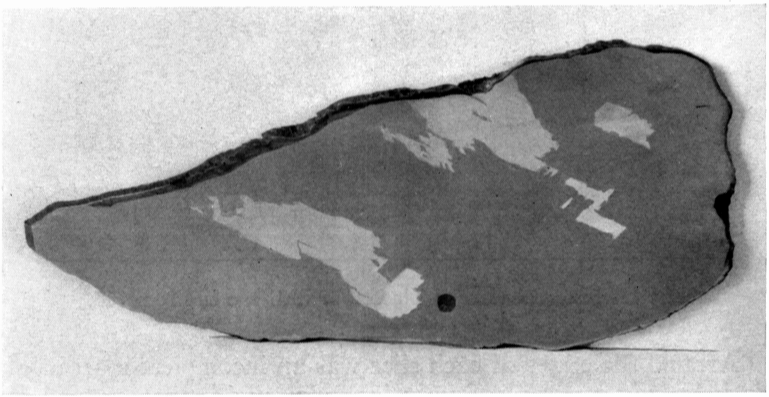

Fig. 2. Etched slice of Tlacotepec.

sponge these loosened particles produced scratches, thus marring an otherwise unmarked surface. These rods in some instances showed a more or less definite arrangement suggesting again a hexahedral structure.

One of the difficulties encountered in etching this meteorite was its tendency to darken before the pattern was sufficiently developed. Upon close examination there were found myriads of minute inclusions of what appeared to be troilite, so small that a good glass was necessary for their detection. It was found that these inclusions were most abundant where the darkening of the metal was most pronounced upon even light etching.

A peculiarity of this meteorite is evidenced in a very noticeable bilateral orientation in all of the slices cut after the first

one. In these slices it is only possible to see the pattern distinctly on one half of the prepared surface at one time—a different angle of illumination being necessary for the two halves which are imperceptibly divided along the longitudinal median axis of the slice. The same is not true of the first slice cut which was just about the central section through the meteorite.

A chemical analysis shows Tlacotepec to be very rich in nickel and poor in phosphorous. Its sulpher content is also low and magnesium almost absent. Its most surprising characteristic is its relatively high content of the platinum metals which amounts to more than four ounces per ton. This is about twenty times as high a content of these metals as the same chemist found in Canyon Diablo irons.

The chemical analysis was made by F. G. Hawley of the Anaconda Copper Co., whose report is as follows:

Fe	82.44%
Ni	16.23
Co	0.68
Cu	0.09
Mn	a trace
Cr.	0.031
P	0.063
S	0.07
C	0.05
Si	0.056 = 0.12 of SiO_2
Pt. metals	0.014 = 4.03 oz. per ton

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