ON THE FAYETTE COUNTY, TEXAS, METEORITE FINDS OF 1878 AND 1900 AND THE PROBABILITY OF THEIR REPRESENTING TWO DISTINCT FALLS.

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Under date of February 10, 1900, Prof. O. C. Charlton, then of Baylor University, Waco, Texas, sent me two chips of a stony meteorite, concerning the exact nature of which he was in doubt, but which were brought to him by a Mr. C. L. Melcher, of Swiss Alp, Fayette County, in that State. Subsequent correspondence developed the fact that three stones had been found by Mr. Melcher, weighing, respectively, 16 pounds 9¾ ounces, 12 pounds 3½ ounces, and 2 pounds 12 ounces. The meteoric nature of the material was easily established, and from the locality where found, color, general texture, and other features of the stones, which were badly oxidized exteriorly, it was assumed by me, as well as by others, that they were a part of the Fayette County (Bluff) stone found in 1878 and described by Whitfield and Merrill in the American Journal of Science for August, 1888. The largest, nearly complete individual of this (1900) find passed immediately into the hands of H. A. Ward and is the 8,619-gram mass figured on plate 64 of Farrington's catalogue of 1916. A 3,136-gram piece, approximately one-half of the 12-pound individual, is in the collection of the United States National Museum, and the remainder is or was in the cabinet of the university at Waco.

As stated above, the identity of the find of 1900 with that of 1878 was unquestioned at the time, and has apparently remained so until the present day. I, at least, had no occasion to doubt until a short time ago when examining a number of thin sections in connection with the occurrence of the problematic phosphate, concerning which I have prepared sundry papers.[1] That the two finds are not identical but must be regarded as two distinct falls will, I think, be apparent from the descriptions below.

[1] See On the Calcium Phosphate in Meteoric Stones, Amer. Journ. Sci., vol. 43, 1917, pp. 322–324.

Concerning the stone of 1878, little more need be added to what is given in the paper referred to above. A broken surface shows a dense, dark-brown stone, very indistinctly chondritic and with none of the mineral constituents determinable by the unaided eye. A freshly polished surface is of a greenish-gray cast and shows abundant flecks of metal, but the chondritic structure still remains obscure (see fig. 1, pl. 86). On going over the sections a second time I find the colorless interstitial mineral full of gas cavities, referred to in my paper of 1888, and concerning the nature of which I was then in doubt, to be a calcium phosphate occurring in the characteristic, irregular forms (see text-fig. 1). It differs somewhat from other occurrences which I have described in that it shows a somewhat higher relief in the section and is rendered actually clouded by the abundance of empty, irregular cavities. Its phosphatic nature has been determined beyond doubt by microchemical tests.

FIG. 1.—CHARACTERISTIC FORM OF PHOSPHATIC MINERAL IN BLUFF, FAYETTE COUNTY, METEORITE. ACTUAL SIZE ABOUT 1.5 MM. IN GREATEST DIAMETER.

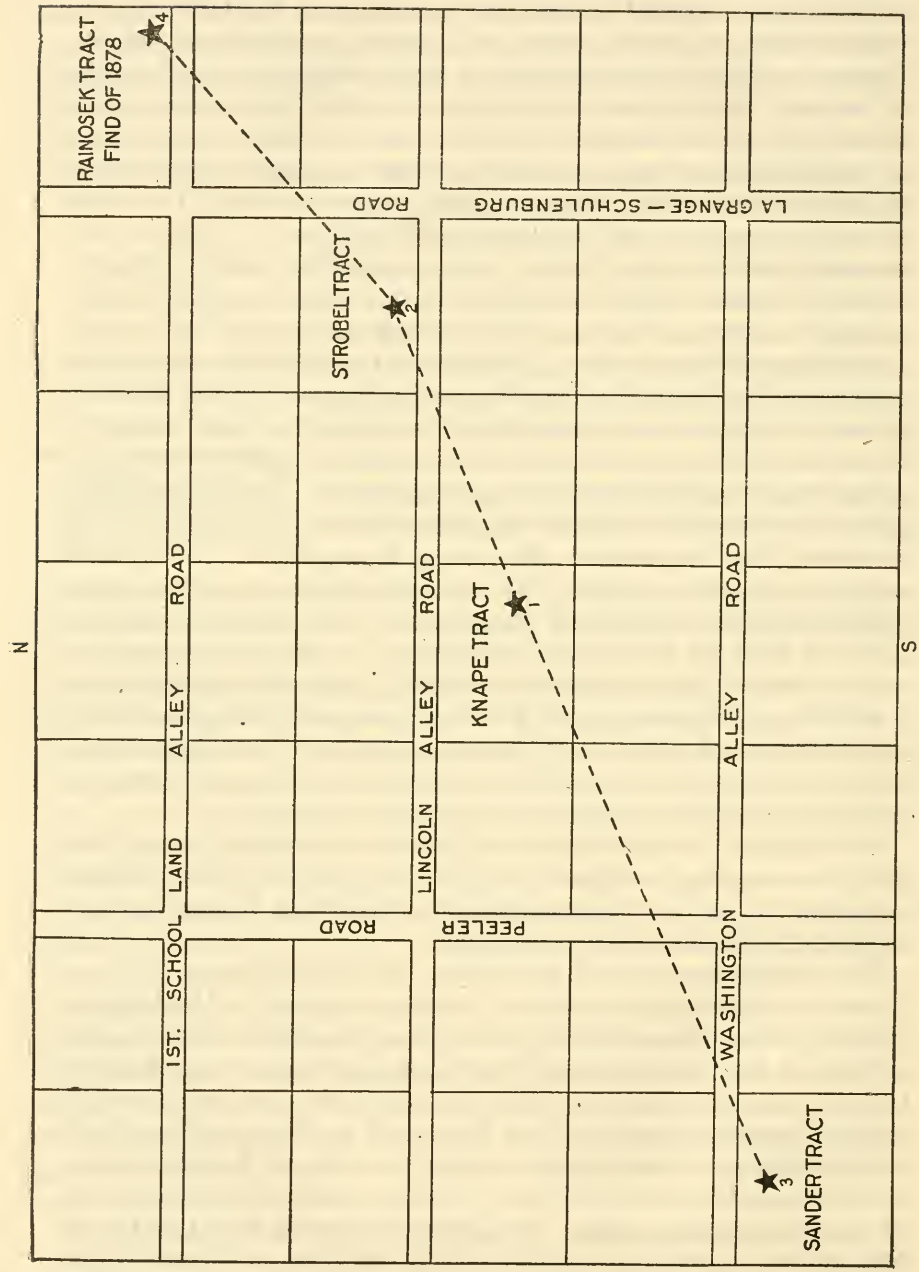
The first chips forwarded of the stone found in 1900 differed but little in macroscopic appearance from the above, being dark brownish in color with no distinctive structural features, though in thin section the chondritic structure is much more pronounced (see fig. 2, pl. 86). The most striking difference lies in the physical condition of the two prevailing silicates, the olivine and enstatite. In the stone of 1878 they are so filled with dust-like particles as to be dull and cloudy, while in that of 1900 they are clear and pellucid. The difference may be compared with that so frequently found between the feldspars of some of our older granites and those of the more recent effusive rocks. Further, the ground of the stone of 1900 is doubtfully crystalline. Indeed, I am disposed to consider it fragmental, and to class the stone, following Brezina, as a veined spherulitic chondrite (Cca). An equally distinctive feature, however, lies in the fact that in the slides of the 1900 stone I find numerous chondrules composed wholly of the polysynthetically twinned pyroxene, none of which appear in any of the slides examined of the 1878 find. The calcium phosphate occurs here also, but in clear, limpid forms lacking the cavities so conspicuous in the other. Both stones are veined, though in the find of 1900 the vein filling seems less dense and the included silicate fragments more angular and otherwise less altered.

An interesting feature brought out by a cross section and shown in plate 87 is the peculiarly pitted character of the interior of the

mass in contrast with the more compact exterior portion and that bordering on the fracture lines or veinlets which traverse it in various directions. All around the margin, for a width varying from 1 to 2 centimeters, is a zone of oxidation projecting irregularly inward, and within which the stone is firm and compact, acquiring a smooth, lustrous surface, and with abundant small, metallic points, mainly of troilite. Each of the veinlets has a similar border varying in width up to 10 millimeters. The areas between the boundary zone and the emargined veins are relatively poor in metallic constituents, and filled with numerous very irregular, minute cavities. The cause of these pittings can not be satisfactorily explained. They are too numerous and too large to have been occupied by metal, in which, in fact, the stone is poor, and indeed it would seem impossible that the metal could have been removed without the sulphide also suffering to a greater or less extent. Neither can they be due to the partial removal of the sulphide, since this mineral remains fresh and unaltered in the outer zones and those bordering the veins, where it would most likely be attacked. Except on the immediate weathered surface this constituent remains quite untouched. The thought suggests itself that the cavities may have been filled originally by lawrencite, but the presence of so large a quantity of this mineral must certainly have resulted in the complete destruction of the stone when exposed to a terrestrial atmosphere. The veinlets, it may be said, are filled by disconnected stringers of metal, sulphide, carbonaceous matter, and secondary iron oxide. In the slice figured there is relatively a large amount of troilite as compared with nickel iron, while in the Bluff stone of 1878 the reverse is true. In a section from a chip of the mass in the Field Museum, which Doctor Farrington has kindly furnished, this does not hold true, however.

It remains to be noted that the 3,136-gram individual of the 1900 stone is more deeply oxidized than that of 1878, which may perhaps mean that it has been longer exposed to terrestrial weathering and inferentially belong to an earlier fall.

The relative positions of the various finds of 1878 and 1900 are shown in the accompanying chart (p. 560) prepared by Mr. Melcher in 1900, but which reached my hands from Professor Charlton only a few days ago. Nos. 1, 2, and 3 on the Knape, Strobel, and Sanders tract represent the localities of the finds of 1900. No. 4 is the 1878 stone brought by Hensolt to New York, sold to Ward, and described by Whitfield and myself in 1888 under the name of Fayette (afterwards changed to Bluff) County. It will be noted it is somewhat out of line with the other three. The distance between Nos. 1 and 3 on Mr. Melcher's drawings is given as about $2\frac{1}{2}$ miles, and 1 mile from 2 to 4.



MAP OF FAYETTE CO. SCHOOL LANDS

The differences between the finds of 1878 and 1900, as I have pointed them out, are in my opinion amply sufficient to warrant their being considered distinct falls. The question of what this 1900 find shall be called is a troublesome one. The name La Grange would be appropriate, but that it has been given to an iron from Oldham County, Kentucky. That of Swiss Alp, Mr. Melcher's post-office address, is unfortunately geographically misleading. It is suggested, therefore, that the stone of 1900 be known as the Cedar, Fayette County stone, Cedar being the name of a small village a little to the southwest of Bluff.

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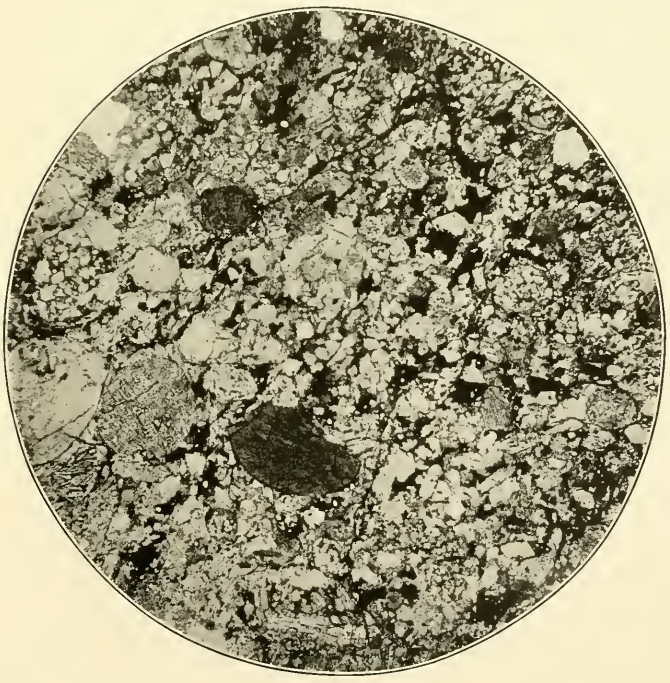
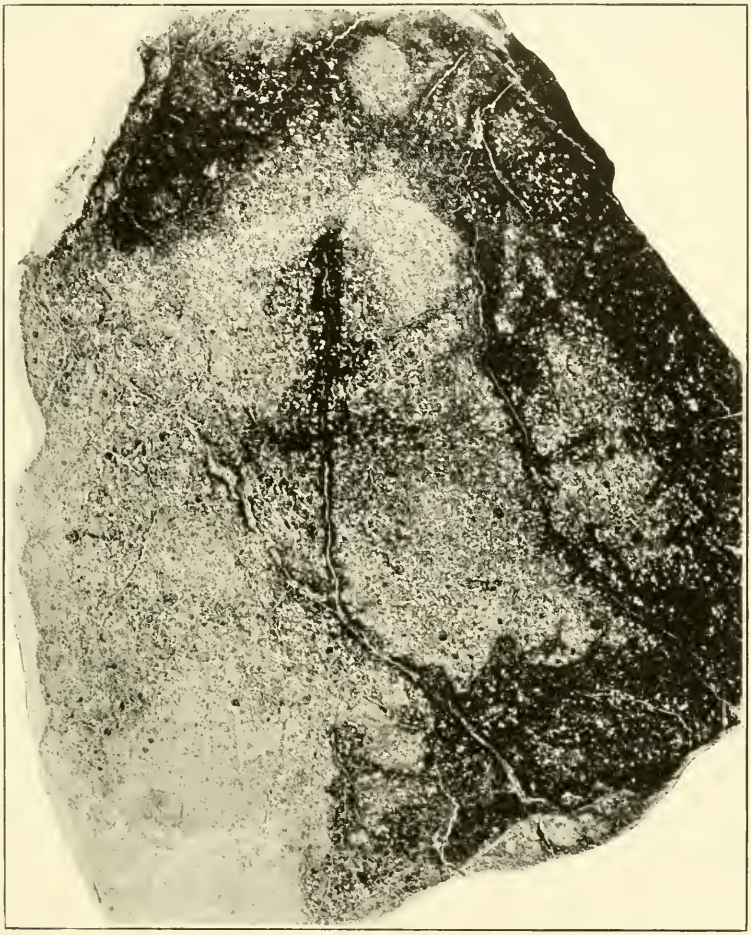
1



2

THE FAYETTE COUNTY, TEXAS, METEORITE

FOR DESCRIPTION OF PLATE SEE PAGE 558



POLISHED SLICE OF THE CEDAR, FAYETTE COUNTY, TEXAS, METEORIC STONE, ABOUT TWO-THIRDS NATURAL SIZE

The polished surface shows a dark, compact margin thickly studded with particles of troilite and some nickel iron (white in the figure). The veins, or properly the cracks, cutting across the surface are emargined by like narrow, compact borders carrying the same constituents. The intermediate gray portions are full of pits or cavities, also showing in white, which at first sight seemingly result from the removal of the metal and metallic sulphide. (See p. 558.)

FOR EXPLANATION OF PLATE SEE PAGE 558