

teor, and described it as like the report of a hundred-pound cannon, which shook his house, and jarred the windows. He at first supposed the disturbance to be produced by the explosion of a boiler at Gann's elevator, in the neighboring town of Riley. Mr. Sprengle, father of L. J. Sprengle of the *Washington Republican*, not only heard the meteor, but looking toward the zenith, shading his eyes from the glare of the sun, saw just below that luminary a swiftly moving mass of waving mist, followed by a double trail of bluish smoke.

This aerolite was seen by many observers at a much greater distance from the place where it fell. Mr. D. C. Ruth of Halstead, Harvey County, Kan. (a hundred and thirty miles distant in a direction slightly west of south), saw a large fire-ball moving through the atmosphere at a few minutes before one o'clock on June 25. It was also seen at Topeka (eighty-seven miles south-east) by a neighbor of H. R. Hilton, Esq. It was reported by the newspapers as having been both heard and seen at Atchison (a hundred and two miles distant) and at Leavenworth (a hundred and fifteen miles distant), the last two places being in a direction east-south-east from Washington. A note received from C. W. Marston, Esq., of Cedar Junction (a hundred and thirty miles south-east from Washington) makes the following statements: "An aerolite passed in sight of this place on Wednesday, June 25, at about 1 P.M. Of the several who saw it, Mrs. John D. Randall says of it, 'It was a ball of fire as large as a table. It had a trail like a comet, and it wobbled like a kite.'"

At Beatrice, in Nebraska, forty miles north-east of Washington, it was reported as a brilliant meteor passing over the city from north to south, leaving a distinct fiery trail behind. The fact that at places to the north of the point of collision with the earth the meteor appeared to be moving toward the south, while at places to the south it appeared to be moving toward the north, corroborates the testimony given by the nearly perpendicular sides of the hole it made in the ground, that it passed through the atmosphere from the vicinity of the zenith.

The meteor reached the ground, and buried itself out of sight, four feet deep, below the eighteen inches of upper alluvium in the underlying shaly clay or "gumbo." This spot is located three miles and a half north of Washington, in Farmington Township, about a hundred yards from the north and south road, near the south-west corner of the north-west quarter of the south-west quarter of Section 13, Township 2, Range 3, east of the sixth principal meridian. The farm belongs to Mrs. Lydia V. Kelsey of Iowa, and was rented by Mr. J. H. January, who was on that day breaking the prairie sod. The noon hour had not quite expired, and Mr. January was underneath his wagon making some repairs, when he heard the sound of the approaching meteor, and came out to ascertain the cause of the disturbance. He had hardly gained the erect position, when the meteor struck the ground only a few rods distant, throwing up the earth to a height of forty feet into the air, and outwards for about twenty-five feet. It was also seen to strike the earth by Miss Guild, a teacher, who was returning to her home in the country after her forenoon's attendance at the Washington County Normal Institute, and was at the instant driving her horse and cart along the north and south road, only a hundred yards distant. As soon as her frightened and trembling horse had recovered from the shock, Miss Guild drove to the spot, which she reached at the same moment with Mr. January. As soon as Mr. January had calmed his frightened horses, he began to dig for the aerolite; and with the help of a neighbor, Mr. J. D. Foster, and three other men, he reached the upper surface of the stone in one hour, but it required three hours to remove the mass from its bed, it was so firmly held in place by the compressed "gumbo." The stone was not hot when reached, which may be explained by the fact that it seems to have passed through the minimum amount of air from a direction but a few degrees south of the zenith. It was covered, however, by the usual burned crust. The stone was found to have been cracked, doubtless by the force of collision acting upon a body already under the disrupting strain of unequal temperatures. The entire mass weighed a hundred and eighty-eight pounds, and was divided by this crack into two portions, weighing respectively a hundred and forty-four and forty-four pounds. The smaller

mass was soon subjected to a process of sledge-hammering by the hundreds of people who almost immediately visited the spot. Nearly every citizen of Washington has in his pocket a small fragment of the stone. The portion remaining, weighing a hundred and forty-four pounds, is somewhat wedge-shaped, in dimensions nineteen by seventeen inches, by eight inches at the base. The writer obtained from Mr. J. D. Foster for analysis a fragment weighing two pounds and a quarter. In color the stone is dark slate, resembling a compact trap-rock. An analysis has been made by Mr. E. E. Slosson, assistant in our chemical department, whose preliminary report is as follows:—

"The stone is of a gray color, and in texture resembles porphyry. A few metallic grains are all that can be distinguished with the naked eye. Under a microscope by chemical treatment the following minerals can be detected:

"1. A white crystalline silicate, insoluble, forming about half the mass of the whole; probably enstatite or a similar bisilicate of the pyroxene group.

"2. A black translucent crystalline silicate intermingled with the above, though less in amount. It is decomposed by *aqua regia*, and contains iron; probably a uni-silicate of the olivine type. These two minerals are in some fragments arranged in alternate microscopic layers of equal thickness.

"3. Malleable nickeliferous iron in small irregular masses, intimately mixed with troilite and the silicates.

"4. Troilite or pyrrhotite in microscopic particles disseminated through the whole rock, estimated from sulphur to be about 10 per cent.

"5. Chromite, distinguishable as small black magnetic crystals in the residue after treatment with the acids.

"6. A few scattered silicious crystals, yellow and red; too small to determine, probably olivine.

"The following is an approximate analysis of a small fragment: metallic iron (with part of the iron in silicates), 14.953 per cent; troilite, 10; soluble silicates (olivine), 25.147; insoluble silicates (enstatite), 49.9; nickel and chromite, undetermined; specific gravity of fragment weighing two pounds and a half, 3.48, water at 25° C."

The hundred and forty-four pound mass has been bought by the writer and Professor F. W. Cragin of Washburn College, Topeka, in equal partnership, for the benefit of the museums of their respective institutions.

F. H. SNOW.

University of Kansas, Lawrence, Kan., July 7.

Another Meteorite from Kiowa County, Kan.

SINCE my communication in *Science* of May 9, in reference to the Kiowa County (Kansas) meteorites, I have again visited the locality, and obtained a 218½-pound pallasite. This is not a new "find," but is one which was first discovered upon the farm of Mr. James Evans more than a year ago. The location may be seen by consulting the map illustrating Mr. Kunz's article in *Science* of June 13. Only about one square foot of the surface of this meteorite, just level with the ground, was exposed to view, and it thus easily escaped subsequent observation on the unploughed, grassy prairie. The dimensions are 20½ by 16½ inches, by 10½ inches at base. The shape is that of an irregular triangular pyramid, and it stands easily upon its base. The specimen, not having been exposed to the weather and the dangers of rough usage, as were the other members of this group, presents fine clusters of olivine crystals in several cavities upon two of its faces. There are eight cavities on one face. Some of the cavities are four inches in diameter and two inches deep. Nearly all the cavities contain fine crystals of yellow olivine and of chromite. Some of the former are $\frac{1}{8}$ of an inch in diameter, and so perfect that the angles can readily be measured. This specimen is also unique in that the crystals of chromite are so large and so prominent. The chromite has a fine lustre, gives a dark-brown powder, and scratches glass.

Much of the olivine is black and glassy, with a conchoidal fracture. It shades imperceptibly into the honey-yellow and colorless varieties. The light variety yields a light-brown powder, and is very brittle. Its fusibility is about five.

At some points on the surface there is a dirty white incrustation. This, on examination, proved to be carbonate of lime, and is without doubt due to the deposits from the calcareous soil in which the meteorite was embedded.

The prevailing color of this iron is dark reddish brown, more inclined to red than others of this fall that we have seen.

On cutting a section from the meteorite, and treating the polished surface with nitric acid, the characteristic Wiedmannstaaten markings are visible. The fragments of troilite can be plainly seen on the polished surface. The meteorite has about the same arrangement of iron, olivine, etc., as others of this group. Its specific gravity, as obtained from the whole mass, is 4.79; that of the iron and nickel alloy is 7.70; of the olivine (yellow), 3.64 (water at 25° C). The volume of the entire mass, determined in the process of obtaining its specific gravity, was found to be 20.6 litres.

Professor E. H. S. Bailey of this university is making a thorough analysis of this pallasite, which he will report in detail at the Indianapolis meeting of the American Association for the Advancement of Science.

F. H. SNOW.

University of Kansas, Lawrence, Kan., July 9.

A Supposed Footprint in Rock.

IN a field belonging to Mr. J. G. Bemis, in the town of Whitefield, Coos County, N.H., there is a rock of granite upon which is the impression of a man's left foot. It is a naked foot, and has slipped slightly in passing over the rock when in a muddy condition. No one had mentioned this fact to Mr. Bemis when he bought the farm. The rock is like the rest of the rocks in the place, granite. The place is a very solitary one; and probably no one, till Mr. Bemis came, who is a man of much observation, ever observed it.

A sketch made by Professor Grundmann, and specimens of the rock, were shown to Mr. Walter G. Davis, the director of the Meteorological Bureau, Cordoba, South America. He considered

it very curious, but, not being a geologist by profession, advised its being brought to notice. The place is two miles north of the village of Whitefield, N.H., not far from The Mountain View House, owned by Mr. W. F. Dodge, and near the estate of the Rev. R. C. Waterston (summer residence). A. W.

BOOK-REVIEWS.

School Supervision. By J. L. PICKARD. (International Education Series.) New York, Appleton. 12°. \$1.

THE author of this book has had a long experience as superintendent of education, first in the public schools, and now at the head of a university. He evidently has a natural aptitude for the work; and this, combined with long practice, has enabled him to produce a work on the duties and usefulness of school superintendents which will be very suggestive to those who fill such positions, as well as to educators generally. He maintains in strong terms the importance of good supervision by State, county, and city authorities, and has no difficulty in showing that it has largely promoted the efficiency of the public schools of this country. He devotes comparatively little space to the State and county superintendents, but discusses at length the work of the city superintendent, pointing out its relation to the teachers, the pupils, and the public authorities, with incidental suggestions on every important point. President Pickard fears that the grading and the minute rules for teaching and for the promotion of pupils are making our schools too mechanical, and earnestly advocates leaving greater freedom to both teacher and pupil. The methods of examination, too, he thinks require amendment, so that the examination shall test the pupil's judgment rather than his memory. He favors moral and religious instruction in the public schools, notwithstanding the difficulties arising from the conflicting views of the various religious sects. His mode of presenting his thought is somewhat marred by a too free use of metaphorical

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