ART. XXXII.—*The Bath Furnace Meteorite*; by HENRY A. WARD.

WE are fortunate in the addition of another—the third—to the number of meteorites which have fallen to earth in the year just past and are on record.

On the evening of November 15, 1902, at about 6.45 o'clock, a brilliant meteor was seen by many persons in the States of Louisiana, Mississippi, Alabama, Georgia, Tennessee, Kentucky, and Ohio, in its progress from southwest to northeast over a course of more than six hundred miles. Its passage was simultaneously noticed by two trained observers—Professor A. H. Miller of the State College at Lexington, Kentucky, and Professor H. C. Lord of the Emerson McMillan Observatory of Columbus, Ohio. These gentlemen both secured the altitude and azimuth of the point where it appeared to burst and vanish, as seen from their rather widely separated stand-points. Calculations based upon these observations gave the approximative place of the fall—where, indeed, it had already been announced—as in Bath County, Kentucky. The detonations which immediately preceded its descent to the earth were heard over a large area in that region, most persons thinking that they were due to the explosions of nitroglycerin, which is often used in “shooting” wells in the neighboring Ragland oil fields.

The aerolite—for such it was—came to the earth in the extreme southern part of Bath County, at an old settlement called Bath Furnace. It struck in the middle of the road, directly in front of the home of Mr. Bluford Staton. Mr. Staton and his wife at once made search for it, but on account of the darkness they failed to find it that night. The next morning, however, Mr. Staton readily discovered the meteorite lying on the surface of the ground on the side of the road, whither it had bounded. It had lost some small chippings by the collision of its fall, but was in the main quite entire.

Mr. Staton in a letter tells me: “It was dark. I saw the light and heard the report. It came through the air, whizzing like a steam-saw going through a plank. * * * The stone struck in the middle of our hard road and bounded away for about five feet to one side. The hole which it made in the road was about one foot long, nine inches wide, and five inches deep.”

The aerolite is in general shape a five-sided polygon, somewhat wedge-shaped when viewed from either the side or the end aspect. Its length is $8\frac{1}{4}$ inches, height $6\frac{1}{2}$ inches, width $4\frac{1}{4}$ inches. The weight of the mass is 12 lbs. $13\frac{1}{2}$ ounces.

The chippings broken off in fall, if added, would doubtless make its total weight just 13 lbs. Its specific gravity is 3.48.

The stone is covered over its entire surface with a very dark—nearly black—crust. This crust, although absolutely opaque and protective, shows itself at the few fractured spots to be very thin—less than half a millimeter thick. It is dull and matte in surface appearance, with a uniform, fine granulation. This is, however, broken at frequent points by minute pimples,

interspersed with equally minute angular or slightly lengthened protuberances. None of all of these have an elevation of more than one millimeter. These pimples, where they have been rubbed, show a bright character, and are undoubtedly outside individuals of the minute points of bright iron which are sprinkled somewhat abundantly through the entire stone mass.

The inner structure of the stone, as shown in a section, is quite compact and dense, taking a good polish. It is a light gray base, blotched evenly throughout with patches of clove-brown iron oxide. Most of these are cloud-like, in indefinite contour; but a few, ranging from one to three millimeters in diameter, are round, and seem to be limited to the decomposition of a single previous iron enclosure. Very few defined chondri are detachable.

The whole mass is sprinkled liberally throughout with bright iron particles. Most of these are distributed as a bright star constellation ; but among them are scattered a small number which are from one to four millimeters in diameter, mostly of irregular, angular shape. In several instances these are broken sharply in two, and are crossed by granular troilite, fine-grained and fresh shining. One of these is a six millimeter triangle in which the three points only are of bright nickel-iron, while the balance is troilite. In two other cases, nodules, two millimeters in diameter, have a center of troilite, with a circumference of bright iron. That the brown blotches before referred to are due to the oxidation of iron cannot be doubted ; but as there has been no opportunity for this process to have gone on, either since the fall of the stone or during its passage through our atmosphere, the question is raised as to its having found the oxygen in the parent body from whence it came?

Pezographs, or finger-mark pittings, are visible on all surfaces of the mass, yet varying notably on different sides. On two sides they are few in number, and only dim depressions—though still unmistakable in their nature. On the other three surfaces they are frequent, and are three to five millimeters in depth, with area as large as the end of an adult human finger. Some few are independently placed, but most of them are confluent, and show the line of movement of the mass through the furrowing air. One notable gathering is curiously like the crowded tracks of three or four kittens' feet. Two of the smaller sides of the mass have a very different pitting,—that thickly crowded rain-drop appearance which is often found on a secondary crust which has formed on a fresh surface after the breaking of the mass in the air. In one place there is a furrow one and one-half inches long and two to four millimeters deep and wide, with walls of overhanging crust. So far as examination has yet been carried, this new aerolite presents no features of form or of composition which are materially different from others of its class. A careful petrographical examination may, however, reveal something of especial moment. The relation of the intruding troilite to the riven particles of nickel-iron certainly merits further investigation.

At my request, Professor Merrill of the National Museum has kindly made a couple of slides of the mass, and reports as follows : " The stone consists essentially of olivine and pyroxene, with the usual metallic sprinklings and troilite. There is present also in small quantities a completely colorless, almost isotropic mineral, which is probably maskelynite, although, if such is the case, it is a product of original crystallization and has not been altered by fusion, as suggested by Tschermak.

The mineral is in too small quantities to be determined accurately from the two sections which I have thus far prepared. The stone is chondritic, but the chondrules show no disposition to separate from the groundmass, and I am inclined to classify it with Brezina's intermediate chondrites (CI)."

The date of fall of this meteorite—November 15th—will not be overlooked. It comes as one of the Leonids whose orbit our earth cuts yearly, as it has been known for a full thousand years to do, on that date. This, as also the Saline Township, Kansas, aerolite (1898), fell on the same day of the month. These (as also Trenzano—November 12, 1856, and Werchne Tschirskaja—November 12, 1843) would seem to belong to the great Leonid stream, estimated by astronomers at many millions of miles in length, which at these dates we have cut at one of its sparse portions, picking up only stragglers in place of the millions which have shown themselves in the dates of thirty-three or thirty-four years apart, when we met with the immense bulk of the stream. It is well known, however, that in the very acme—so to call it—of these greatest of meteor-showers—1766, 1799, 1833, 1866—the number of meteorites which have reached our earth has not been greater than at other periods (of three days) in the year. Bath Furnace (for so we will call this stone) is still none the less suggestive as a Leonid.

Professor Farrington has already called attention (*Science*, July 11, 1902) to the fact that of the three above-mentioned meteorites which have thus far been known to fall at the time of the Leonid showers, all have had a nearly similar structure,—veined globular chondritic (CCA). We regret that Bath Furnace should not wholly coincide in this feature with the other three known Leonids (?).

Bath Furnace adds a twelfth one to the meteorites which are to the credit of the State of Kentucky. Only two of these are stones, and both of them (Cynthiana and Bath Furnace) have fallen in closely adjoining counties, only about forty miles apart. This, with an interval of twenty-six years.

We omitted to say in its proper place in this article that this Bath Furnace meteorite passed promptly from the hands of the finder, Mr. Bluford Staton, to those of Mr. W. H. Dougherty, who in turn deposited it for sale with Professor A. M. Miller in Lexington. From him the writer duly obtained it, and has given it a place among the other 302 aerolites (stones) which make an important part of the Ward-Coonley Collection of Meteorites now on deposit and display in the American Museum of Natural History in New York.

620 Division St.,
Chicago, Ill.