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*Collection of Observations on the Day-light Meteor of Nov. 15, 1859,
with remarks on the same.* By BENJAMIN V. MARSH.

This meteor made its appearance at about half past 9 o'clock, A. M., (New York time,) the weather being perfectly clear, and the sun shining brightly.

It was *seen* at Salem, Boston, and New Bedford, Mass.; Providence, R. I.; New Haven, and many other places in Conn.; New York City; Paterson, Medford, and Tuckerton, N. J.; Dover, and other places in Delaware; Washington City; Alexandria, Fredericksburg, and Petersburg, Virginia.

It was *heard* at Medford, New Jersey, and at *all* places in that State, south of a line joining Tuckerton and Bridgeton, and throughout nearly the whole of Delaware.

With perhaps two or three exceptions, it was *not seen* by any one in New Jersey, south of the Camden and Atlantic Railroad; that is to say, *throughout the very region where the report was loudest.*

Many persons there, saw a momentary flash of light "like the reflection of the sun from a looking-glass," but could not tell where it came from.

The appearance of the meteor at different places is described as follows:—

Salem, Mass.

Francis F. Wallis, pilot, saw it as he was rowing across the harbor. He says, "When first seen, it was bearing about S. W. at an elevation of about 45°. Its path was nearly a straight line, making an angle of about 40° with the vertical, tending westward. Its apparent size, one-sixth the surface of the full moon—its appearance, that of a star, and quite brilliant—color, light red—leaving a train like that of a rocket, which was visible nearly the entire time, from the meteor's first being seen, until it disappeared behind the land, which probably had an elevation of three degrees. The train was of a pale reddish hue—time, from five to eight seconds—no sound heard."

Boston, Mass.

"E. F. Kinsman saw a meteor fall in the woods, in the south part of Natick—a circular luminous body terminating in a cone-like appendage. The woods were searched, but no trace found."

Pawtucket, R. I.

Mr. Blanding says, "It appeared to fall into Narragansett Bay, near the city of Providence. When first seen, it was near the zenith, and it passed down with great velocity, until beyond his vision—the sun was shining brightly."

Middletown, Conn.

A passenger on the stage from Middletown to New Haven, says, "A ball of fire was seen to descend, with a gentle lazy motion, to the earth, within a few hundred yards of the stage. We made search, but found nothing. The light was peculiarly white, and the motion somewhat undulatory."

New Haven, Conn.

It was seen by several persons, whose observations have been carefully investigated by E. C. Herrick of Yale College, who says, "Judge W. W. Boardman was standing on the sidewalk in such a position that the meteor's path is excellently determined by means of terrestrial objects. On going to the place which he occupied, it is found, by compass and quadrant, that the bearing of the meteor, when first seen, was S. 29° W. at an elevation of 15° to 18° , that it shot obliquely down towards a more westerly point, making an angle of about 33° with the vertical, and disappeared behind a steeple, at an altitude of 6° , bearing S. $35^{\circ} 34'$ W. The meteor did not pass the steeple, which is quite narrow, and here subtends an angle of about two degrees. I cannot be sure of the angle made with the vertical within 5° or 10° . The meteor was not more than two, probably not over one and a half seconds in sight, and appeared about as large as the full moon. An observer in the northern part of the city, where there was no material obstruction, saw the meteor disappear above a distant house, the top of which I have ascertained to be just 2° above his horizon. The place of disappearance may have been a half or one degree higher."

Mr. H. also mentions an observer on the Woodbridge hills, who saw it disappear above the horizon.

Hartford, Conn.

The *Hartford Courant* says it was seen by E. D. Tiffany, and that "It appeared to him about two feet in diameter, with a luminous appendage differing from the tail of a comet, inasmuch as it tapered from the nucleus. He was so certain that a few minutes search would have found the meteor, that only want of time prevented his attempt to bring it home as a trophy. It is certain 'the thing' fell upon Connecticut soil."

On the Hudson near Fort Washington.

Capt. Adams, of the schooner *Tryall*, says, "I saw what seemed to be a ball of fire about as large as a man's hat, coming almost directly towards my vessel, from an angle of about 45° . It left a wake or tail of about 15 feet in length, clearing the vessel but a few feet, and struck the water with a hissing sound about fifty yards off our port bow, and was lost to sight."

New York.

It was seen by great numbers, nearly all of whom appear to have thought it fell very near them. The police in the Central Park thought it fell within that enclosure.

The *Post* says, "Nucleus 1 foot in diameter, and the length of the tail, by the same scale, about 20 feet; the shape being a cone tapering to a fine point at top. The color was that of a bright yellow fire, and its brilliancy may be estimated by the fact that this color developed itself above the brightness of the sun, shining at the time through a cloudless sky. It disappeared behind the houses so abruptly, that it must have struck the earth very near the city."

The *Times* says, "Resembling in shape an inverted balloon, with a tail 100 feet in length trailing after it."

A gentleman on the Elizabethport steamer, was sure that it fell within a few feet of the stern of that vessel.

Prof. Loomis, in the January number of *Silliman's Journal*, from the estimates of several observers at New York, concludes that the point of the horizon where the meteor vanished, was 21° west of south, that the length of its visible path was from 15° to 25° , and that the entire period of its visibility did not exceed one or two seconds.

Newark, N. J.

Henry J. Mills estimated the inclination of the meteor's path to the vertical, to be about 45° .

Medford, N. J.

Robert B. Stokes was standing on the sidewalk in the shadow of the Burlington County Bank, engaged in conversation, when he saw the meteor *over* the building. Chas J. Allen, of Philadelphia, has recently visited the spot, and measured the bearings and elevations, as pointed out to him by Mr. S.

He states that Mr. S. was on the *east* side of a street which runs S. $1\frac{1}{2}$ W. and was looking eastward. Thinks the meteor when first seen was almost due east (which would require it to have had an elevation of at least 59° and probably 65°), but this direction is uncertain. If exactly south-east, the elevation may not have exceeded 48° . Mr. A. is inclined to adopt 30° S. of E. as the most probable direction of first appearance, at an elevation of about 58° .

It shot down towards the south, and disappeared behind a house about 500 feet distant, on the *west* side of the street, bearing S. $9\frac{1}{2}$ W. at an altitude of $2\frac{1}{2}^{\circ}$.

Mr. S. thinks he remained in the open air three minutes longer, and then went into a house without having heard any report.

The sound was heard by many persons in that vicinity. One lady who was in the house heard it, and ran out thinking the chimney was on fire.

George Haines noted the time immediately after the sound *ceased*, and after making allowance for probable error of his watch, makes the time 9 35 A. M. He estimates its duration at two minutes.

Tuckerton, N. J.

Theophilus T. Price says, "A few persons in this vicinity saw a 'ball of fire,' as they express it, pass apparently from a very high region of the heavens, and from nearly overhead, and descend towards the earth in a south-westerly direction, very far off.

"Others saw only a flash of light, while a very large majority of those who heard the rumbling noise, saw nothing unusual previously. The concurrent testimony of those who saw the flash, or the meteor itself, fixes the time that elapsed between the appearance and the report, at between three and four minutes. This would make its distance from this place between forty and fifty miles, which agrees very well with other circumstances known in reference to it.

"At the time the event occurred, a number of workmen were repairing a bridge over Wading River, nine miles westward of this place. The foreman, a man of veracity and intelligence, informed me that

himself and those that were with him, had a distinct view of the fall of the meteor. There being very little wind, the surface of the river was smooth, and, while busily engaged above it, they were suddenly startled by a flash of light upon the water beneath them, and looking up, beheld a 'ball of fire' receding and descending in the distant south-west. The foreman looked at his watch, and remarked that it was twenty minutes to ten o'clock. Presently, they were again startled by the roaring, rumbling, or rushing noise, which seemed to jar the air around them, and which so many thousands of persons in Southern New Jersey heard with wonder and even with terror.

"Either during the continuance of this noise, or at its close (I do not recollect which my informant stated), he looked at his watch again, and found the time sixteen minutes to ten. He says that the meteor exploded and disappeared before it reached the horizon, and that it had a short train or tail. It disappeared perhaps within ten degrees of the horizon.

"This account is concurred in by his workmen, and coincides with another related by a woodman near Tuckerton, who was in the act of felling a tree, and looking up to see which way it would fall, saw, as he says, 'a large ball of fire' shoot out of the sky, and sink away in the south-west. He was very much frightened, and spoke of it to a gentleman who came up immediately after, who says that three or four minutes elapsed before the terrible roaring began.

"The next week after the phenomenon occurred, I was in the southern part of this State, and as far south as Cape Island; and wherever I went, it was the common subject of conversation. At Tuckahoe and Marshallville on Tuckahoe River, the noise was said to proceed from a cloud of smoke, very high, nearly or quite overhead; while in the middle and lower parts of Cape May County, it was invariably spoken of as being in the north. Several persons in various parts of Cape May County saw the cloud of smoke, but I heard of none who saw the meteor itself."

Mr. Price further says, "I venture the opinion that the meteor came from far beyond our atmosphere, and struck it some distance north-east of the place of its disappearance, passing in a south-west direction towards the earth at an angle of less than forty-five degrees from the perpendicular. If an aerolite, it must have fallen to the earth somewhere in the vicinity or south of Tuckahoe River. I would place its locality somewhere in the forests between Tuckahoe and Maurice Rivers. It is possible that it reached the Delaware Bay in Maurice River Cove, but this I do not think very probable, from the fact that the cloud of smoke seemed nearly or quite vertical at Marshallville."

Again. "The sky was perfectly cloudless, and the wind blowing lightly from the south-west. The noise is variously described, as resembling the quick and *successive* discharges of artillery, the rumbling of a train of cars over a wooden bridge, or the prolonged roar of distant thunder. It continued more than a minute. The noise proceeded from the south-west, and appeared to such as were in the open air, to be above the earth."

Georgetown, Del.

Dr. D. W. Maull says, "Two persons in this vicinity witnessed it, who say it appeared to fall on the ground, not 100 yards from the place where they stood—a noise like the rumbling of the cars on the iron track.—It shook the ground sensibly.—Several minutes, say from four to five, between the flash and report.—The meteor was like a round ball of fire, very brilliant, about the size of one's head, with a tail at least ten feet long, which was quite as bright as the body.—No cloud or smoke observed."

A letter from Baltimore Hundred, in this county, states that, "Several teams were in the road, and the oxen suddenly sprang as though frightened, and the drivers were nearly blinded, and a something was perceived, going through the air, six inches in diameter, with an appendage fifteen feet long, with the forward end a-blaze—all of which settled in a field near by. This was witnessed by a number of people."

Washington, D. C.

J. S. M. writes to the *National Intelligencer*, "Coming in from Georgetown, and being on the north side of the Avenue, very near the western angle of the inclosed space at the intersection of I street, I was startled by the appearance of a meteor of unusual size and brilliancy. Walking eastward, but looking down the Avenue, the vividness of the meteoric light was so intense as to attract my vision from that direction, to the line of I street, immediately over the central part of Senator Gwin's mansion. The meteor itself was a clearly defined object, of a light almost as dazzling as the sun, and of a diameter perhaps three-fourths that of the full moon as seen in the zenith. Surrounding the nucleus of the meteor, was a luminous band of apparently twice its own diameter, and extending vertically 15° to 20° ; terminating, however, not in the expanding form of meteoric trains, as generally seen, but in a clear sharp point. Indeed, the whole train of light was singularly well marked against the sky, without nebula or scintillations, excepting that to the northward, and in almost touching proximity to the base of the meteor, there was a companion-ray of light, but of a red color, traveling with it.

"When my eye first caught sight of the object, its base was about 30° from the horizon, and the direction of its track was strictly vertical. It was, perhaps, two seconds in view, for I had time, after seeing it first, to grasp my companion's arm and point to it before it disappeared behind Mr. Gwin's house. My friend had, however, seen it, and his description of it is, that it was like a *huge maul* of fire falling from the sky. The time of observation was precisely twenty minutes past nine, A. M. Without professing scientific lore, it strikes me that the most singular features of this phenomena, were its marvellous brilliancy—so near the sun as it was—and the sharp *artificial* character of its contour."

J. S. L., in the *Union*, says that he was in the open fields, and on high ground affording an uninterrupted horizon, near Glenwood Cemetery, and saw "a meteor falling almost perpendicularly from the heavens. It seemed to fall about four miles from me, in a N. E. direction—ap-

peared to reach the ground. There was a perpendicular line of fire about 100 yards long, with a massive ball of fire at the lower end, about the size of a barrel, and shaped like an inverted balloon."

Prof. Henry says, "I have, myself, verified, on the large map of the city, the direction of the meteor as seen by Mr. Marion Force, one of the assistants in the Smithsonian Institution. He pointed out the precise place on the map where he stood, and the point at which it appeared to descend, and find that the latter bears 4° N. of E. from the former. I have also examined the position of the other observer, J. S. M., on the large map, and find the two observations very nearly agree as to the direction of the disappearance of the meteor; the observation of the latter differing not more than one degree farther north than the former. On questioning Mr. Force particularly as to the perpendicular descent of the meteor, he concludes that it was slightly oblique to the horizon, and apparently descended to the ground, a little north of the foot of the vertical through the point of its first appearance."

A communication, signed "H" in the *National Intelligencer*, referring to the same observation, says, "The meteor first caught the eye of the observer at an elevation of about fifty degrees."

(To be Continued.)

For the Journal of the Franklin Institute.

The Meteorology of Philadelphia. By JAMES A. KIRKPATRICK, A. M.,
Professor of Civil Engineering in the Philadelphia High School.

The importance of a knowledge of the peculiarities of our climate to the physician, the agriculturalist, and the engineer, has long been acknowledged. The physician compares the prevalent diseases of a month with the climatic conditions of the same period, and hopes thereby to obtain a clue to the cause of a disease, or a hint in regard to the means of preventing or counteracting it. The agriculturalist looks over the almanac anxiously, but in vain, to ascertain what kind of weather may be expected at a certain time, so that he may with confidence sow his seed, or refrain for a more favorable opportunity. The engineer and builder learn by close observation of the weather, that a certain period is favorable to the commencement of their operations, which, if neglected, will throw them back perhaps a month or more. So the political economist, taking into view all these circumstances, may draw from them conclusions in regard to time and causes, which may have great influence on the general wealth and health of the community.

In order that a permanent record of the meteorological changes observed may be preserved, I propose, in addition to the general tables furnished by the Committee on Meteorology, to give a general review of the points of interest in each month, and compare the month or season of the current year, with the corresponding month or season of the last year, and of the preceding nine or ten years.

JANUARY.—The year 1860 opened with very cold weather, the thermometer, on the morning of the 2d, marking but $3\frac{1}{2}$ degrees above