CHAPTER 1

The night the stars fell

The most grand and brilliant celestial phenomenon ever beheld and recorded by man. RICHARD DEVENS (1876)[1]

DENISON OLMSTED's left eye cracked open a slit. It was still night. He shut his eye. Something had awakened him. A noise from outside – sort of a muffled moan? Or was it the brightness of the sky visible through the curtains? Just the light of the full moon high in the heavens. Yes.

No.

Suddenly both his eyes shot open and he sat bolt upright in bed.[2] November 12 – no, now the 13th. It's new moon. The sky should be dark.

Then came a pounding on the door and the voice of his next-door neighbor, "Denison. Denison. You must see this. Look out your window."

He sprang from his bed – too fast – weaving dizzily, lightheadedly, the few steps to his window and pulled the curtain aside. He looked. A shiver of ice shot down his back.

In a moment he was heading out his door. He did not remember pulling his coat on over his nightclothes or wedging into his shoes. He stepped outside and looked up, his vision no longer framed and limited by his window – and a chill shuddered through him again. He saw not a meteor or two that would have made an ordinary night memorable. He saw dozens of shooting stars, fireballs, at every moment, in every direction. The sky was full of . . . fireworks. His first instinct was to duck, to fall to the ground and cover his head to protect himself from these falling objects.

The appearance of these meteors was striking and splendid beyond anything of the kind he had ever witnessed.

There were so many, and yet – it was so . . . organized. It appeared that the meteors were all spreading out from a single region – no, a single point – high in the sky, near the zenith. Where in the star field? The falling stars made it hard to get his bearings. But it was Leo. The meteors were all . . . all? – yes, as best he could see – all radiating from the constellation Leo, the Lion. From the curve of the sickle-shaped pattern of stars that is supposed to be the Lion's mane.

But it wasn't that all the meteors started right at that point in Leo and raced away in all directions. Leo stood out because there were few meteors visible there. Only short streaks, sometimes bright. Or just momentary

glowing dots, like fixed stars swelling in brightness and then fading away. No, Leo was the center of this pageant because all the meteors he could see in every corner of the sky were streaking away from Leo. With so many of them, he could see it clearly. Even if a meteor trail started almost halfway across the sky from Leo, its trail was always away from Leo. The starry show was radiating out of Leo.

Olmsted wondered how widely this spectacle could be seen and what the reaction to it was. In that instant, he sensed that he, a college teacher of astronomy, was privileged to be seeing an astronomical happening of historic magnitude. He had trained most of his life for such an opportunity. Would he be worthy? He redoubled his efforts to look closely and remember everything. He concentrated his thoughts on seeing the event scientifically.

Date. November 13, 1833.

Time. He didn't have his pocket watch. His neighbor did. It was 5:15 a.m.

Conditions. Excellent. No clouds. No Moon. Mild for November. No wind. Orion, Sirius, and Procyon in the southwest. Balancing that brightness were Venus and Saturn in the southeast. He could see them through the blizzard of falling stars primarily because they were among a tiny minority of stars that were not in motion.

He tried to focus on one meteor at a time, then another. It was difficult to do. Bright flashes caught by the corners of his eyes continuously distracted him. Each bright meteor left behind a vivid streak of light, ending in what sometimes seemed to be a puff of smoke, sometimes an explosion, sometimes . . . just vanishing.

And then he noticed – it was eerie – there was no noise from the heavens, no sound of explosion. He strained to listen more carefully. He did hear a noise, rising and falling with the bursts and lulls of the shower. It was . . . a moan. It was . . . people. A collective noise of shock and awe and – fear. People awakened as he had been from a sound sleep. Standing beneath a sight they had never seen – or been warned about – or imagined. Perhaps like no starfall ever seen. He wondered for just an instant whether this vision might yet be a dream.

Concentrate. Some meteors were brighter than others. Some brighter than Mars or Jupiter or even Venus, the planets that outshine the brightest of the true nighttime stars. His neighbor had seen one nearly as bright as the full moon, and seemingly that large in the sky.

When he first stepped outside and looked at the meteors, it appeared that they were all raining down from a point nearly straight up – the zenith – where Leo, the Lion, stood. Now, half an hour later, it occurred to Olmsted and his neighbors observing near him that the point of apparent radiation of the meteors had shifted. The meteors were still radiating from

Leo, in fact, from near the star Gamma Leonis, but that radiating point had moved westward. The radiant of the meteor shower was moving westward in synchronism with the stars. The westward motion of the stars was created by the Earth spinning on its axis from west to east, once around in a day, causing the stars and Sun and Moon and planets to rise and set. Clearly, these shooting stars were not traveling with the Earth. They must come from space, far beyond our planet.

Light was creeping up the eastern horizon. Dawn had come. The meteors were fewer and fewer now, but still they fell. Was the shower declining or was it just getting harder to see the shooting stars because of the twilight? He could still see bright ones. The fall of meteors must be continuing unseen into the morning light.

Not much time left. Notice everything. You never know what might be important.

The weather. On the evening of the 11th, it had rained copiously, giving way on the 12th to gusty winds from the west. The skies cleared by evening and he had seen . . . a few falling stars . . . before bedtime. And now, the weather was perfect. Any connection? Time for that later.

Had anything like this deluge of meteors ever happened before? It seemed to him he had read about something like this. He thanked the neighbor who had awakened him and said good night – good morning, rather – to the other citizens and rushed inside to begin writing while the memory was still fresh. He might just have time to dash off a brief report and offer it to the newspaper, ending with a request for accounts from other observers.

Now where had he read about a previous extraordinary meteor storm? A travel book. Yes, Humboldt. He owned a copy. Yes, there it was, near the beginning of his travels in South America. Humboldt and Bonpland saw a meteoric spectacle from Cumaná in 1799. Huh. Look at that. The meteors fell in the early morning hours of the 12th of November. That was worth noting.

Olmsted delivered his impressions to the *New Haven Daily Herald* and his article was published that same day, including his hope to hear from other observers.

The response overwhelmed him. Other newspapers across the young nation had picked up his report and Denison Olmsted, 42 years old, professor of mathematics and natural philosophy at Yale College, found himself the clearinghouse for information and interpretation of the stars that fell on November 13, 1833. It was to be the defining moment of his career.

The ecstasy of the sight

From Alexandria, Virginia:

A more magnificent and splendid spectacle was never presented.[3]

From Baltimore, Maryland:

It seemed to rain fire.[4]

From Charleston, South Carolina:

Those who were up before the dawn yesterday witnessed a most glorious sight – one glance at which "were worth ten years of common life."[5]

While Denison Olmsted was noticing that the meteors were streaming out of Leo and that this point of radiance was sliding westward with the star field as the Earth turned, observers all over the young United States were recording their impressions, overwhelmed by the sight of meteors beyond counting.

From Boston, Massachusetts:

Meteor succeeded meteor in such rapid succession that it was impossible to count them; at times the sky seemed full of them, and the earth was illuminated as with a morning light.
. . . Those who were so fortunate as to witness the scene describe it as brilliant beyond conception . . .[6]

From Natchez, Mississippi:

From 3 to 5 o'clock, the scene was truly magnificent – thousands upon thousands [of meteors] were darting about in all directions without an instant's cessation. It was so light that upon first awaking many thought that the city was on fire.[7]

From Bowling Green, Missouri:

The most perfect master of language would fail of conveying to others a full picture of this extraordinary and uncommon appearance . . .[8]

It even got to be a matter of competition between cities as to which was blessed with the most radiant celestial performance. New York claimed victory over Philadelphia.

The celestial exhibition of yesterday morning is noticed in the Philadelphia papers, but it is evident from their accounts that it fell far short both in the number of meteors and the brilliancy of their light of the splendors visible in our city. A correspondent of the [Philadelphia] National Gazette estimates their number at two thousand one hundred and sixty in the compass of two hours and a half. More than that number were visible here within every ten minutes of that period, and it was as difficult to count them as to number the raindrops."[9]

This disparity was to play a major role in the subsequent controversy about the cause of the meteors.

Newspapers throughout the country were proud of their rational, unsuperstitious coverage of the meteor barrage. They began the day the stars fell by publishing the accounts of local observers and continued on and off for the next six weeks, as the papers reprinted each others' stories and offered commentary from local scientists and from Olmsted.

The press, South and North, reported the terrified response of illiterate slaves to the unexpected and unparalleled sight of the meteoric avalanche, but the tone was not smug hauteur or amused condescension. Instead, the white plantation owners and newspapermen generally responded with respectful understanding and even agreement.

From Hartford, Connecticut:

> The negroes [in] the South who saw the phenomenon describe it as *"snowing fire"*: they generally thought the Judgment day had come.[10]

From Combahee, South Carolina, a planter wrote:

> I was suddenly awakened by the most distressing cries that ever fell on my ears. Shrieks of horror and cries for mercy I could hear from most of the negroes of three plantations, amounting in all to about six or eight hundred. While earnestly listening for the cause, I heard a faint voice near the door calling my name. I arose and, taking my sword, stood at the door. At this moment, I heard the same voice still beseeching me to rise, and saying "O my God, the world is on fire!" I then opened the door, and it is difficult to say which excited me most – the awfulness of the scene or the distressed cries of the negroes. Upwards of one hundred lay prostrate on the ground – some speechless and some with the bitterest cries, but most with their hands raised, imploring God to save the world and them. The scene was truly awful; for never did rain fall much thicker than the meteors fell towards the earth; east, west, north, and south, it was the same.[11]

It was not just the blacks screaming. From Raleigh, North Carolina:

> The scene was truly awful and indescribably sublime; . . . it carried to the bosoms of many terror and consternation. Some imagined the world was coming to an end and began to pray; and a gentleman from the country states that such was the alarm produced in the neighborhood where he was [that] the welkin every where around him resounded with cries of distress.[12]

Observers frequently found validity in the slaves' reactions. The author of the Raleigh newspaper story, struggling to describe the shower, said that it looked, "to use to the striking expression of an untaught son of Africa, 'like it was snowing stars.'"[13]

Nestled among the accounts of terrified slaves were reports that the educated white population was not one bit less stunned and confused and

scared. A Macon, Georgia newspaper minced no words: "We do not jest when we say that stubborn knees were bent and flinty hearts melted into deep contrition at the alarming prospect of 'the heavens on fire.'"[14]

The scene looked to many Christians like the end of days portrayed in the New Testament. An anonymous observer in Bowling Green, Missouri wrote in the *Salt River Journal*:

> Forcibly were we reminded of that remarkable passage in Revelations which speaks of the great red dragon . . . drawing the third part of the stars of heaven and casting them [down] to the earth. . . . That figure appeared to be fully painted on the broad canopy of the sky – spread over with sheets of light and thick with streams of rolling fire. There was scarcely a space in the firmament which was not filled at every instant with these falling stars.[15]

The meteors inspired bizarre behavior:

A reliable witness

It was the predawn hours of November 13, 1833 in Annapolis, Maryland. The Reverend Hector Humphreys was sleeping soundly. In only two years as principal (president) of St. John's College, he had saved the school from bankruptcy by prevailing on the Maryland state legislature, meeting a few blocks away, to provide an annual subsidy. Using this endorsement, he could raise funds to build new buildings and expand the student body.

His wife Marie startled him awake. "Fire!" Her voice was shaking – "Fire! – as she stumbled toward a window. The room was bright, lighted from outside. The sky was a shower of sparks. Yet they could see no building on fire; could smell no smoke; heard no alarm. They dressed hurriedly and rushed outside.

That same day Humphreys sat down to write what he had seen for the *Annapolis Republican*. When an article on the meteors by a Yale professor appeared, requesting other accounts, he sent his newspaper report to, what was his name? – Olmsted. After all, Yale was his alma mater.

> They all appeared to move outward from a common centre, at or near the zenith. At times, they completely filled the whole heavens with beautiful brilliant streams of light, extending to the horizon. I do not mean that all the trains actually extended from the zenith to the horizon, but that the lines of light were *so directed* that if extended backwards, they would all converge to a point in the zenith. Their appearance was often so incessant that all the stars of the firmament seemed to be darting from their places. Many persons thought a shower of fire was falling and became exceed-

Hector Humphreys. Courtesy St. John's College

> A fellow near Georgetown, District of Columbia, who had robbed a hen roost and was carrying off his booty, is said to have been so much frightened at what he believed a threatened judgment that he ran back and was caught in the act of returning his plunder.[16]

An observer in Fredericksburg, Virginia found in the meteors a presage of the Civil War, still more than a generation away:

> The whole starry host of heaven seemed to be in a state of practical secession and revolt . . . which finds parallel only in the affairs of earth.[17]

Newspapers did not stop with recording public reaction. Reporters, editors, and readers made an effort to explain the meteor deluge scientifically. The most frequently expressed belief was that the shooting stars were caused by a change in the weather. As the *Huntsville* (Alabama) *Democrat* wrote in its weekly issue the day after the great meteor storm:

> ingly alarmed. The light was so intense that some sleepers woke up thinking that their dwellings were in flames.
>
> The phenomenon must have continued more or less vividly for four or five hours. Many intelligent people in this city saw them and agree that there was an *almost infinite number of meteors*. They fell *like flakes of snow*.
>
> It is said that some of the meteors were seen to fall upon the earth and to rebound into the air. As no vestiges, however, have been discovered upon the ground, it may be presumed that this was an optical deception. No audible explosion attended any of the meteors. It was a perfectly *silent and simultaneous dance of the stars*. It is probable that the phenomenon was seen over a wide range of the country. A gentleman living several miles beyond the Severn River saw the meteors there in as great abundance as they occurred here. The steamboat Maryland was about to leave Cambridge, on the eastern shore of Chesapeake Bay, so the hands were up at an early hour, and all on board agree substantially with what was witnessed at Annapolis.
>
> Notwithstanding the strong persuasion of several observers that the meteors fell upon the ground, I am convinced that their paths were in the upper and rarer strata of the atmosphere, since optical principles show that in darting away to the horizon, they would *appear* to descend and to strike into the earth. The usual theory of meteors – that they are caused by inflammable gases high in the atmosphere – does not appear to explain the phenomena. If we admit that the gases are generated and diffused sufficiently to kindle up the whole heavens with light, the combustion of them would not present those *innumerable distinct sparks* which shot from the region of the zenith with such *perfect uniformity of direction*. This uniform direction of motion was in fact the most remarkable point in the whole phenomenon.*

* Condensed and slightly paraphrased from Humphreys' letter to Denison Olmsted as it appeared in "Observations on the Meteors of November 13th, 1833." *American Journal of Science and Arts*, volume 25, number 2, January 1834, pages 371–373. Humphreys' italics for emphasis have been retained.

Here and elsewhere in long quotations of 19th century English I have retained the phrasing but modernized the punctuation to avoid confusion.

A practical joke

Late in life, James Flanagan, a judge in Clark County, Kentucky, recalled the "falling of the stars" on November 13, 1833, "the memory of which shall remain with me as long as life lasts." It "scared everybody to prayers," he said.

"The people were struck with awe, and thrown into great consternation," Flanagan remembered, "and one of the effects of the remarkable occurrence was to awaken a pious feeling, causing a general religious revival throughout Christendom." At the Log Lick Church, the congregants took the falling stars "as a sign that the end of the world was near at hand." Even after dawn brought an end to the meteor shower, "the little church was crowded to overflowing day and night with an eager and earnest people, singing and asking pardon for their many sins. Old feuds were reconciled, enemies were made friends . . . for they expected at any moment to hear the last trump sound and be called to an account of their doings here below."

A few citizens, however, "took no part in the religious mania, among them Thomas F. Danaldson and M. Fritz, who were noted as practical jokers."

> One night when the congregation had gathered at the little church and were listening with fear and trembling to the awful warning that the end was near at hand, Danaldson and Fritz, having procured a long tin bugle and a ladder, climbed to the top of the church, and just as the preacher was exhorting his hearers to be ready as Gabriel's trumpet might sound at any moment, Danaldson blew a blast "both loud and shrill" on the tin bugle, and Fritz proclaimed from the house top in stentorian tones that he was the Angel Gabriel sent to proclaim the end of the world and summon all nations to arise and come to judgment.
>
> Hearing all this, the audience inside fell in a promiscuous heap on the floor, some begging for a little more time and others begging for immediate mercy and pardon. They remained in the church until broad daylight, and when they had finally mustered courage to venture out, the two "Gabriels" were nowhere to be seen and the old world was standing just as it always had stood. For a long time this affair remained a mystery, except to a few who were on the inside of the joke.*

* James Flanagan: "Falling of the Stars. The Remarkable Phenomenon that Scared Everybody to Prayers in 1833. Danaldson's Long Trumpet, and What He Did with It. M. Fritz Proclaims Himself the Angel Gabriel." Transcribed by George F. Doyle. No publisher, no date; cataloged as "Clark County, Kentucky – Meteorites"; four typewritten pages held by the University of Kentucky library.

> It is no doubt the effect of an impure state of the atmosphere – the weather for some days having been warm and damp, but suddenly changed to cool or frosty.

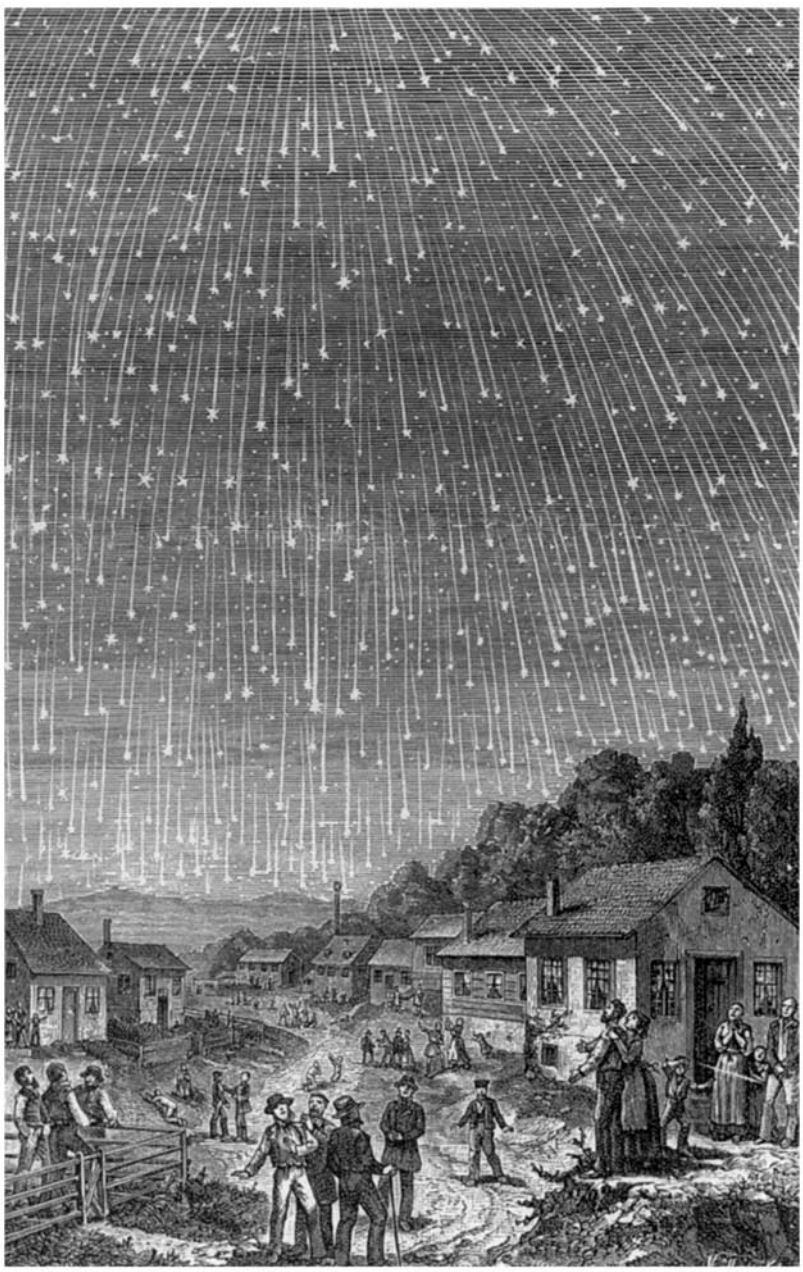
Other newspapers fell back on the most prominent scientific theory of shooting stars, which from the time of Aristotle had linked meteors to meteorology – part of the everchanging weather patterns of Earth. Thus meteors were not associated with the planets or the stars; meteors were not part of astronomy.

The *Florence* (Alabama) *Gazette* looked up shooting stars in Conrad Malte-Brun's *Universal Geography* textbook and explained that meteors were caused by hydrogen gas that had been "sulphurated." As this sulphurated hydrogen gas rose to high elevation, it mixed with oxygen and was ignited by a spark so that the oxygen and hydrogen formed water and the sulfur fell to the ground as a "fetid, glutinous matter of a whitish color bordering upon yellow."[18]

Another theory, a favorite among Americans because of Benjamin Franklin's prominence in experiments with electricity, was that the meteors were an electrical disturbance somewhere in the atmosphere – a special form of lightning.

Virtually every observer of the great starfall of November 13, 1833 agreed with Virgil H. Barber of Frederick, Maryland: "I observed the most brilliant phenomenon of nature I ever [saw]." Denison Olmsted was equally awestruck: "The appearance of these meteors was striking and splendid, beyond any thing of the kind [I have] ever witnessed."

But Olmsted did not stop with a recollection of grandeur. He decided to take another step – to try to understand what he had seen.



The meteoric shower of November 13, 1833. Courtesy Seventh-Day Adventist Church