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The Night of Falling Stars: Reading the 1833 Leonid Meteor Storm

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Abstract. In 1833, a massive display of the Leonid Meteor Storm over America caused its population panic and wonder over these fantastic, unknown 'fireballs'. With so many eyewitnesses, the Storm provides an interesting account of how both professional and amateur astronomers at this time sought to communicate this phenomenon through language. All of these observers specifically utilize metaphorical language, which ultimately proves most viable in bridging the observational scientific characteristics of the event with the deep, emotional awe it inspires.

> *One record stated that the Kiowa… were wakened by a sudden light. Running out from the tipis, they found the night as bright as day, with a myriad of meteors darting about in the sky. The parents aroused the children, saying, "Get up, get up, there is something awful going on." They had never before known such an occurrence, and regarded it as something ominous or dangerous, and sat watching it with dread and apprehension until daylight.*
>
> Von Del Chamberlain[1]

> *The heaventree of stars hung with humid nightblue fruit.*
>
> James Joyce[2]

[1] Del Von Chamberlain, 'The Leonids Meteor Shower', Project ASTRO. Available at http://www.clarkfoundation.org/astro-tah/vondel/Leonids98.html.
[2] James Joyce, *Ulysses* (New York: Penguin Classics, 2000), p. 819.

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Setting

In 'A Lincoln Reminiscence', Walt Whitman shares a story of a young Abe Lincoln being asked, early during the Civil War, if he had lost confidence in the ultimate survival of the Union. According to Whitman, Lincoln responded with an astronomical anecdote:

> "When I was a young man in Illinois," said he, "I boarded for a time with a Deacon of the Presbyterian church. One night I was roused from my sleep by a rap at the door, & I heard the Deacon's voice exclaiming 'Arise, Abraham, the day of judgment has come!' I sprang from my bed & rushed to the window, and saw the stars falling in great showers! But looking back on them in the heavens I saw all the grand old constellations with which I was so well acquainted, fixed and true in their places. Gentlemen, the world did not come to an end then, nor will the Union now."[3]

The event Lincoln witnessed was the Leonid meteor storm of 1833, a massive meteor shower seen by most of the then United States. Accounts of eyewitness reaction were numerous, with another account appearing in the *New York Sun* a day later:

> An amiable young woman, daughter of a respectable merchant in Canal Street, while witnessing the atmospherical phenomenon, swooned, and was carried to her chamber. She soon recovered, however, but appeared very much dejected. She had become impressed with the belief that the phenomenon was prognosticative of the dissolution of all things, which so preyed on her mind as to cause her death.[4]

These two disparate reactions illustrate an example of the methods (and problems) of understanding the sky in nineteenth-century America. As astronomy began to be taught in the schools and became more and more a recognizable, legitimate pursuit, people began to look to the heavens within more scientific contexts. Finding solace in the unmoved 'facts' of the 'grand old constellations', Lincoln considers the comets as passing anomalies, trusting that 'there must be some cause' for them which

[3] Walt Whitman, 'A Lincoln Reminiscence', in *Complete Poetry and Collected Prose* (New York: Library of America, 1982), p. 1072.
[4] 'An Amiable Young Woman . . .', *The New York Sun*, 14 November 1833.

makes sense in the greater (albeit unknown) scheme of things. Lincoln does not know this cause, but through the process of *induction* (noticing that the stars stand still) he infers that everything will be all right.[5] Years later as he recounts the story, he concludes: 'Gentlemen, the world did not come to an end then, nor will the Union now'.[6] In this case, the meteors give him license for inspirational, believable metaphor – the sky didn't fall; neither shall the young country he seeks to inspire.

Sadly, the opposing reading of the event proves to be just as powerful. Like the Deacon who sees only a Biblically-figured Apocalypse, the nameless (perhaps by design) woman of Canal Street sees only what she knows through Scripture: fire and fear and all bad things. And these signs she reads are quite powerful – within days she is dead, 'impressed' by the doomsday in her head and the power of the signs she had witnessed. And since the world *doesn't* end (the *Sun Times* cannily survives to print another edition), the woman is portrayed via its alarming, anonymous text as foolish: both as the 'amiable', uneducated (in terms of her specious reasoning) daughter of a 'merchant', and as the helpless victim ('impressed', 'preyed') of an Apocalypse the rest of the public is thankfully spared.[7] The print paints her as oddly tragic, worthy only of our skepticism and sympathy.

It is exactly this sort of interpretive tension – between science and religion, the astronomical objective and phenomenological subjective –

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[1] The definition of 'induction' from *Webster's Dictionary*, 1828 edn. Available at http://www.cbtministries.org/resources/webster1828.htm:

> 1. Leading or drawing; persuasive; tempting; – usually followed by to.
> A brutish vice, Inductive mainly to the sin of Eve. Milton.
> 2. Tending to induce or cause. [R.]
> They may be… inductive of credibility. Sir M. Hale.
> 3. Leading to inferences; proceeding by, derived from, or using, induction; as, inductive reasoning.
> 4. (Physics) (a) Operating by induction; as, an inductive electrical machine. (b) Facilitating induction; susceptible of being acted upon by induction; as certain substances have a great inductive capacity. Inductive embarrassment (Physics), the retardation in signaling on an electric wire, produced by lateral induction. – Inductive philosophy method. See Philosophical induction, under Induction. – Inductive sciences, those sciences which admit of, and employ, the inductive method, as astronomy, botany, chemistry, etc.

[6] Whitman, 'A Lincoln Reminiscence', p. 1072.

[7] 'An Amiable Young Woman . . .'.

that I wish to explore within the larger context of the 1833 Storm. I believe that the moment of the Storm, which coincides with an outcropping of amateur astronomy, cannot only illustrate these interpretive tensions, but reveal its very modern evolution as indebted to metaphorical methods more at home in poetry than astronomy. Why? As astronomy became more 'advanced' after the Scientific Revolution, its status as a metaphysical subject for the Imagination perhaps became more limiting. Ralph Waldo Emerson laments this in 'Nature' (1836):

> The human heart concerns us more than the poring into microscopes, and is larger then can be measured by the pompous figures of the astronomer.[8]

American poet Emily Dickinson agrees in her poem Fr70, 'Arcturus' is his other name:"

> What once was "Heaven"
> Is "*Zenith*" now –
> Where I proposed to go
> When Time's brief masquerade was done
> Is mapped and charted too[9]

Dickinson vexes over the change in nomenclature: her starry, divine 'Heaven' is now a straight, perpendicular 'Zenith', with much (if not all) of its previous connotation lost. As new order is found in the skies, one such disorder that arises may be found in literature as writers of the self seek to find their place in an increasingly objective world. Engulfed in a climate where meaningful authority has shifted to the realm of observable physical data, observers are given both opportunity and challenge: to make meta- of the purely physical. But like Keats' speaker in 'Lamia', the writer of human feeling – the poet – cannot help but find this 'truth' to be lacking: 'Do not all charms fly / At the mere touch of cold philosophy?'[10]

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[8] Ralph Waldo Emerson, 'Nature', in Carl Bode, ed., *The Portable Emerson*. (New York: Penguin, 1981), p. 222.
[9] Emily Dickinson, *The Poems of Emily Dickinson*, ed. R.W. Franklin (Cambridge MA: Belknap, 1999).
[10] John Keats, 'Lamia', in David Perkins, ed., *English Romantic Writers* (Chicago IL: Harcourt, 1967).

The challenge then faced by the individual under the skies of fact is how to navigate language to both adhere to these emerging new laws and words of scientific truth, of 'facts', yet remain true to the immeasurability of human feeling evoked by the unknown Universe. For though science may represent what Coleridge calls 'caressing the heretical' in terms of its promise of absolute objectivity, it is also provides new meanings for language.[11] By steeping their words in 'the observation of facts', I believe that the 1833 Leonid Storm illustrates how subjectivity may indeed be allowed for under newly scientific skies through the simple act of metaphor.

The Storm

The Teton Indians of the Great Plains called it 'Storm of Stars Winter' or 'Winter of the Falling Stars', using simple figurative language to describe the frightful moment of a sky covered by shooting stars. Today, we know this event as the Leonid Storm of 1833, a cyclical occurrence that takes place when Comet 55P/Tempel-Tuttle's orbit crosses the Earth's trip around the sun – approximately once every thirty-three years. But in 1833, these were unknown facts.[12] As a set of mysterious signifiers, the new meteors were read through a variety of interpretive lenses. The Mormon prophet Joseph Smith wrote

[11] Samuel Coleridge, *Collected Letters* (Oxford: Clarendon, 1971).

[12] As Agnes Clerke notes in *A Popular History of Astronomy During the Nineteenth Century* (London: A. and C. Black, 1902), p 330: 'A search through old records carried the November phenomenon back to the year 902 A.D., long distinguished as "the year of the stars". For in the same night in which Taormina was captured by the Saracens, and the cruel Aghlabite tyrant Ibrahim ibn Ahmed died "by the judgment of God" before Cosenza, stars fell from heaven in such abundance as to amaze and terrify beholders far and near. This was on October 13, and recurrences were traced down through the subsequent centuries'. In retrospect, The Leonids have a rich history from 868 CE on. Some of the more notable years include the 1630 shower (which lit up the funeral of Johann Kepler); the 1799 version as seen by Humboldt from Venezuela; the 1899 'Great Disappointment', and the large storm accompanying Tempel-Tuttle's rediscovery in 1966. An eyewitness account – taken from Mark Littmann, *The Heavens on Fire* (New York: Cambridge University Press, 1998) – provides contrast to the 1833 observers: 'We saw a rain of meteors turn into a hail of meteors too numerous to count' - Charles Capen in the San Gabriel Mountains of Southern California.

> I arose, and to my great joy, beheld the stars fall from heaven like a shower of hailstones; a literal fulfillment of the word of God, as recorded in the Holy Scriptures, and a sure sign that the coming of Christ is close at hand. In the midst of this shower of fire, I was led to exclaim, "How marvelous are Thy works, O Lord! I thank Thee for thy mercy unto Thy servant; save me in Thy kingdom for Christ's sake."[13] (History of the Church 1:439)

Smith sees the meteors as a clear 'sign' of God's displeasure. But most saw it simply as a natural event, ascribing thoughts of doom to the more less-educated citizenry. As the *Boy's Book of Astronomy* relates it:

> On November 12, 1833, there was a *real* meteor shower. The falling stars were as thick as snowflakes, and the southern Negroes thought the end of the world was coming, and they groaned, wept, and prayed. Many of my friends have been told by their grandparents about this shower, and most of them describe it as the night when "all the stars fell."[14]

Like the nameless woman of Canal Street, the slaves are cheaply given the burden of ignorance, which in turn paints any non-scientific view of the event as merely superstitious or quaint. This is proof that not only had the 'new' scientific revolution of the 1800s taken hold in America by this time, but that her citizens were up to practicing it.

Most people looked upwards and, though baffled, tried to find facts in the midst of confusion. Agnes Clerke chronicles the night's historical significance by focusing only on values of location and data.

> On the night of November 12-13, 1833, a tempest of falling stars broke over the earth. North America bore the brunt of its pelting. From the Gulf of Mexico to Halifax, until daylight with some difficulty put an end to the display, the sky was scored in every direction with shining tracks and illuminated with majestic fireballs. At Boston the frequency of meteors was estimated to be about half that of flakes of snow in an average snowstorm. Their numbers, while the first fury of their coming lasted, were quite

[13] This speech was delivered in Kirtland, Ohio sometime in the fall of 1833.
[14] Goodwin D, Swezey, *Boy's Book of Astronomy* (Boston MA: E.P. Dutton & Co., Inc., 1936), p. 228.

> beyond counting; but as it waned, a reckoning was attempted, from which it was computed, on the basis of that much diminished rate, that 240,000 must have been visible during the nine hours they continued to fall.[15]

Clerke relates that the 'tempest' involved 'numbers' so 'beyond counting' that a 'reckoning' could only be attempted afterwards.

Explanations

The Leonids took such hold on the public imagination because of their inability to be explained by the science of the day. They could also be seen. But people were divided as to what they saw:

> Probably no celestial phenomenon has ever occurred in the country since the first settlement, which was viewed with so much admiration and delight by one class of spectators, or with so much astonishment and fear by another class.[16]

Indeed, in the hours and days after the thirteenth, theories flew everywhere. The *Charleston Courier* published a story on how the sun caused gases to be released from plants recently killed by frost. These gases, the most abundant of which was believed to be hydrogen, 'became ignited by electricity or phosphoric particles in the air' and took the form of the brilliant display in the sky. The *United States Telegraph* of Washington, DC, confidently proclaimed that

> The strong southern wind of yesterday may have brought a body of electrified air, which, by the coldness of the morning, was caused to discharge its contents towards the earth.[17]

Despite these early, creative attempts to explain what had happened, it was Denison Olmsted who ended up explaining the event most accurately in terms of the science we generally accept today. Olmsted, a Yale

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[15] Clerke, *A Popular History of Astronomy*, p. 32; Agnes Clerke, *Problems in Astrophysics* (London: A. and C. Black, 1903).

[16] Denison Olmsted, 'Observations on the Meteors of November 13th, 1833', *The American Journal of Science and Arts* 25 (1834), ed. Benjamin Silliman: p. 363.

[17] *United States Telegraph*, 13 November 1833.

professor of Mathematics, was widely known because of his two highly successful textbooks: *A Compendium of Natural Philosophy* and *An Introduction to Astronomy*. But when he stood on his front lawn watching the meteors in awe, he came upon an intuitive explanation for it. Olmsted explained that

> the emanation of the showering meteors from a fixed "radiant" proved their approach to the earth along nearly parallel lines, appearing to diverge by an effect of perspective; and that those parallel lines must be sections of orbits described by them round the sun and intersecting that of the earth.[18]

Olmsted explained what the 'shooting stars' were: fragments of debris caught up in the larger orbit of a recurring comet that burned up in the atmosphere (due to the curvature of the Earth and motion of the comet) as streaking, parallel lines. Olmsted revealed that the experience for us observers was a relative one: though it looked as if the comets were streaking from a single point in the sky, it was indeed *us* moving towards *them.* Not only is this theory quite impressive considering Olmsted came to his conclusion without satellites, computers, or telescopes, but it illustrates the contradictory (and often frustrating) form of sidereal astronomy – since you couldn't always believe what you saw, you had to, crudely sometimes, understand things primarily by the way they related to other things.

To prove his hypothesis, Olmsted conducted a very public experiment in which onlookers were invited to contribute to his eventual findings; he asked (through his articles in the newspapers) that everyday people send in *their* views of the Storm. He then published these observations in the January 1834 issue of *Silliman's Journal, The American Journal of Science and Arts*, vol. 25, a quarterly publication devoted to (chiefly) the 'Sciences': rocks, plants, animals, and occasionally, the sky.[19]

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[18] Olmsted, 'Observations on the Meteors', p. 329.

[19] Of Silliman: 'His principal responsibility was to see knowledge advance and to be sure that it was distributed through the entire Republic', see Chandos Michael Brown, *Benjamin Silliman, A Life in the Young Republic* (Princeton NJ: Princeton University Press, 1989), p. 322. The goal of the *Journal* was that it 'should resemble, in quality and regularity, the European journals -- it would appear on schedule, have illustrations in place, and exhibit a proper and consistent style of editing'(Brown, *Benjamin*, p. 307). Brown notes of its influence: 'Horatio Conant learned of it in Waynesfield, Ohio, from an issue of

Silliman's Journal: Conflicting Methods

Olmsted begins by describing his own experience with the meteors: 'About day break this morning, our sky presented a remarkable exhibition of Fire Balls, commonly called *Shooting Stars*'.[20] His choice of language is also interesting: the term 'Shooting Stars' is not only an illogical unscientific, vernacular term, but also implies continuing action, and thus is more descriptive than it is perhaps scientifically correct. This continues as Olmsted tries to paint a picture in the minds of his readers rather than offer up sharp-edged, technical jargon:

> To form some idea of the phenomenon, the reader may assign a constant succession of fire balls resembling sky rockets, radiating in all directions from a point in the heavens, a few degrees south-east of the zenith, and following the arch of the sky towards the horizon. They continued their progress at different distances from the radiating point, but their directiveness uniformly such, that the lines they described, if produced upwards, would have all met in the same point of heaven.[21]

Olmsted stages his description by first centralizing it from 'a point' which he systematically fixes as 'a few degrees south-east of the zenith'.

Curiously, almost none of the surviving illustrations of the 1833 storm recreate the picture put forth by Olmsted. In fact, most of the illustrations were created after the event and accordingly show more of a total effect, not the moment of the actual 'shooting'. In text, Olmsted can evoke this better as he proceeds through his hierarchy of observation:[22]

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the *New York Commercial Advertiser* that had found its way to Fort Meigs. 'Living quite in the "Ultima Thule" from all literary influence', he took the time to inform Silliman, 'I am anxious to derive a little light from the New England constellation if possible' (Brown, *Benjamin*, p. 305). Silliman also wrote anonymous poetry as the seer 'Shahcoolen', even going so far to publish a volume of verse.

[20] Olmsted, 'Observations on the Meteors', p. 365.

[21] Olmsted, 'Observations on the Meteors', p. 365.

[22] The best approximation to a visual analogue to what this must have looked like is not ironically achieved by so-called special effects and science fiction: the hyperspeed effect achieved by the Millennium Falcon in the *Star Wars* movies. For those readers unfamiliar, a single point appears on the horizon of space and all of the stars in the sky turn to parallel lines of convergence towards this single point of destination. The idea behind this was that if faster-than-light speed is

> The balls, as they tumbled down the vaults, usually left after them a wind streak of light, and just before they disappeared exploded, or suddenly reached themselves into sand. No repeat or noise of any kind was observed, although we listened attentively… The flashes of light, although less intense than lightning, were so bright as to awaken people in their beds.[23]

We can see in the following picture that representation is definitely made a function of both time and space.

Figure 1. Engraving from *Bible Readings for the Home Circle* (1879),

possible, the observer's eye would indeed be faster than the light emitted by these stars, which would show only as long, stretched-out lines. It is a remarkable effect as it indicates motion as well as an almost palpable sense of stillness. Popular reference aside, it sounds exactly like Olmsted's (and others') description of the meteors.

[23] Olmsted, 'Observations on the Meteors', p. 365.

Just as Olmsted's adjectival verb 'shooting' implies motion, so too do the etchings of the comets indicate movement through their elongated tails. Since this storm was of a previously unseen magnitude whose mechanism involved unknown, assumedly invisible lines of force, accurate representation becomes a critical means of understanding the event. For his science to stick as fact, he must not only corroborate his observations, but also set them into language, 'recording' them in textual form. For any scientific apprehension of the sidereal, representation in language is essential.

Accounts

> *There you are: Mysterious and Unknown Descartes. Highland plains. Apollo 16 is gonna change your image. I'm sure glad they got ol' Brer Rabbit, here, back in the briar patch where he belongs.*
>
> John Young*, Apollo 16* astronaut[24]

Following Olmsted's lead, people *did* send in their own accounts of the Leonid storm, with the *Journal* publishing most of them in their entirety, and without editorial commentary. In Boston, a report in the *Columbian Centinel* begins with the observation: 'This morning there was the appearance of a thick shower of fire'.[25] The unnamed writer goes on:

> Having risen as usual at 4 o'clock, I thought I [???][26] saw very light falling stars, but as the window was covered with steam… I saw but indistinctly… except that twice I saw a very sudden and [???] glare of light.[27]

[24] John Young, 'Transmission at 119:04:05. Apollo 16 Lunar Surface Journal', 16–27 April 1972. Available at https://history.nasa.gov/afj/ap16fj/02_Day1_Pt2.html.
[25] Olmsted, 'Observations on the Meteors', p. 366.
[26] At this point the text becomes illegible in the copy I used, held at the Dittrick Medical Library at CWRU in Cleveland, OH. My research indicates that some of these entries have never been reprinted before except in excerpts. The best published resource of them is Littmann, *The Heavens on Fire*
[27] Olmsted, 'Observations on the Meteors', p. 367.

He sees, of course, the meteors, which he describes as 'falling about half as thick as the flakes of snow in one of our common snow falls'.[28] He stands transfixed:

> I stood observing the phenomenon full 15 minutes before 6, at which time, the meteors being fewer… If I am correct in my estimation, that would show the number of meteors falling during the 15 minutes to have been 8660.[29]

As Olmsted does, this Bostonian observer uses *time* as a point-of-reference. His self-knowledge of 'having risen as usual at 4 o'clock' speaks to the general American self-awareness of time, something indicative of the proliferation of mass-produced clocks. By putting the storm in terms of numbers (even extrapolated ones) this observer is at least certain of answering the question *when*. Outside of numbers, all he has is his likening of the event to a snowstorm. But once he takes it all in, earlier events begin to make rational sense:

> The steeple of the neighboring church was reddened by the light of them; and I then supposed that the glare of light in my chamber… must have been from meteors.[30]

This Franklinian, early-to-rise man uses inductive reasoning just like the slippered Yale professor: seeing the meteor light hit the church and its 'reddened' effect on the steeple, he concludes (deduces – a confusing term) that it was also the cause of the glare in his home. This is *not* strict mathematical deduction; otherwise he would have had not only to predict the meteors, but sit outside on the porch and wait for them. He cannot use the deductive method because he doesn't know what the shooting stars are – only that they have 'the appearance of' of raining fire. His method is not a perfect estimation of the astronomical 'truth,' but it works for him *practically* at the level of representation in language. He finds truth in what he sees, making connections to other phenomena. And the symbolism of this moment isn't lost as it is the meteors which redden the church and not vice-versa; it is only the sky that has control over its meanings, not the pulpit.

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[28] Olmsted, 'Observations on the Meteors', p. 367.
[29] Olmsted, 'Observations on the Meteors', p. 367.
[30] Olmsted, 'Observations on the Meteors', p. 367.

That same early morning, at West Point, a 'Mr Alexander C. Turning, Civil Engineer' notes that the sky 'suddenly lighted up in a state of rapid meteor shower, a certain distance and gone in a second, leaving where they had passed a luminous trace'.[31] As Olmsted does, Turning almost immediately locates a central fixture for the event in space and time: 'As a definite point, I should select as near the truth a small star in the Lion's neck 37 degrees half past 5 o'clock mean time'. Turning doesn't know exactly *how* this is happening (no one does at this point), but can tell his readers (and Olmsted) *where,* most likely due to his training in surveying at West Point.[32] His denominative 'mean time' also suggests knowledge of the difference between mean (terrestrial) and sidereal (space) time. This also shows that the mechanism behind this event (a sidereal one) might be understood in terms of its *relative* intersection with the terrestrial, evidence being his attention to numbers.

A professor of Chemistry at Mount Saint Mary's College in Maryland, 'Dr Akin' similarly begins his observation with the phenomenon's center:

> The point was in the neck of Leo (and) was of no great extent, not larger perhaps than a circle ten degrees in diameter, from this center as a radiating point, proceeded the meteors in numbers exceeding the visible stars.[33]

The best physical description Akin can provide is that 'the scene was altogether brilliant beyond conception', and he even admits it is 'beyond his vocabulary to de-scribe it'.[34] But after a few lines of self-deprecation (and yet another likening of the stars to falling snow), Akin manages a scientific explanation: the display is the result of the *fermentation of the effluvia of acid and alkaline halides*' that 'float in the atmosphere'.

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[31] Olmsted, 'Observations on the Meteors', p. 369.

[32] The Naval Academy, the first four-year engineering school, opened by Act of Congress in 1850.

[33] Olmsted, 'Observations on the Meteors', p. 373.

[34] Keep in mind that the night sky of this young America was not the 7-10 stars we might see from any even slightly-urbanized region here in the twenty-first century. Back then, free from the modern curse of incidental electric light, you could see thousands of stars, making relative measurements all the more meaningful.

Akin comes up with a scientific hypothesis or guess, but even he immediately realizes its futility in grasping this unearthly event. As he closes his narrative:

> A profound thinker has said, "He that knew not what he himself meant by learned terms, cannot make us know any thing by his use of them, let us beat our heads about them ever so long." So I advise you not to beat your head long about the latter supposition.[35]

Even the professorial author *knows* his theory is wrong, and his admission offers clues as to why. Not only is the occurrence he witnesses 'beyond his vocabulary' (his explanation is based in terrestrial chemistry, not astronomy), but such terms may not succeed at letting others 'know any thing' about it.[36] What this implies is not only the sidereal nature of the event as outside any known language or schema, but also its capacity as a subjectively-felt phenomenon. Akin wishes he did know the terms for what he sees (and what they mean) but such terms simply do not exist. Consequently, Akin's inductive foray falls flat, and implies another approach: since astronomy is a natural, amateur enterprise, 'learned terms' may not suffice here. In many ways, this is a more interesting hypothesis than the 'alkaline halides': he posits that subjective language is in fact necessary to understand the event because of astronomy's lack of specific vocabulary.

As for the storm's spatial center, the 'Reverend Dr. Humphreys, Pres. of St. John's College' at Annapolis agrees: 'They all appeared to move from a common centre; at or near the zenith; and at times, they completely filled the whole heavens'.[37] Though a man of the cloth, he limits his non-scientific commentary to the fact that though 'Many persons thought a shower of fire was falling and became exceedingly alarmed… In the words of most, they fell, *like flakes of snow*'.[38] Like the first account from Boston, the good Reverend opts for a natural metaphor rather than a more apocalyptic one. He also adds that

[35] Olmsted, 'Observations on the Meteors', p. 374.
[36] This also speaks to the specialization of the sciences – the chemist can no longer understand everything else and freely admits it.
[37] Olmsted, 'Observations on the Meteors', p. 371.
[38] Olmsted, 'Observations on the Meteors', p. 372.

> No audible explosion so far as we can learn attended any of the meteors. It was, as it were, a perfectly *silent and simultaneous dance of the stars*.[39]

The comets are strictly visual characters; there is no attendant sound whatsoever, only an awesome and majestic *sight*, which Humphreys chooses to explain in visual terms of what it looks *like* – not only snow, but something artistic and beautiful: a *dance*. Instead of the technical language of ;alkaline halides', this observer chooses a more visually-descriptive route – that of metaphor.[40]

In the case of the meteors, metaphor is used ('snow', 'dance') to represent what the event looks like, not what it is. But though an oblique reference, metaphor helps broaden an object's less-tangible meanings. For the choice of metaphor ('snow', for instance) not only implies harmlessness, but silence, the natural, even the sublime. That the shooting stars 'dance' is another step altogether and reveals not only the seeming orderliness and magnificence of the display, but also the speaker's subjective view of it as not an apocalyptic experience, but rather a surreal, even aesthetic one. It is not terrible, like, say a swarm of bees or a battle of men, but it is artful, ordered, and beautiful. The metaphor thus adds to the subjective meaning of the signifier, even if the actual meaning itself isn't readily known. In this way, the construction of metaphor itself can be an inductive exercise: rising from a centrally-seen symbol, metaphorization allows the speaker to arrive at new conclusions based on visual (and felt) similarities. Are they correct? Literally, no, but they work practically to represent the subjective experience in language. This is why Beardsley argues metaphor as 'intensional: we find it in words, not in the objects to which they refer' – it is subjective by design.[41] The

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[39] Olmsted, 'Observations on the Meteors', p. 372.

[40] The *Princeton Encyclopedia of Poetry and Poetics* defines metaphor as 'a trope, or figurative expression, in which a word or phrase is shifted from its normal uses to a context where it evokes new meanings. When the ordinary meaning of a word is at odds with the context, we tend to seek relevant features of the word and the situation that will reveal the intended meaning'. This standard definition implies that the opposite of metaphor is an absence of this shift from normal usage and would be the ordinary, literal meaning of a word, i.e., snow is 'snow'.

[41] Alex Preminger and T.V.F. Brogan, eds, *Princeton Encyclopedia of Poetry and Poetics* (New York: MJF Books, 1993), p. 764.

result of metaphor-making is here what Eco terms 'encyclopedic knowledge' which produces 'implications that can be shared within a speech community'.[42]

The commonality of the meteor observances is their act of first locating the event's center – usually by noting time but then also its space – as a point measured in the sky. This is indicative of not only the storm's near-total abstraction (it is all they *can* measure effectively), but also the process of creating metaphor by locating a primary subject, or *tenor*.[43] The 'snow' and 'dance' are the vehicles of the metaphorical representation. These terms, 'tenor' and 'vehicle', as initially used by I.A. Richards, are only constructs to understand how we make metaphor; clearly, the act itself is *much* older. But given the sidereal, invisible nature of astronomy at this time, the use of metaphor to describe things in terms of effect makes practical sense. However, it is not Ra or Zeus or God sending down fire from heaven, but fragments of physical, particulate matter. In this way, what I am terming 'scientific metaphor' acts to represent actual phenomenon, which it may do if centralized in a common point of origin affixed in numerical measurements of space and time. Since space and time are relative quantities, both scientific and metaphorical subject must be located before it may be measured or compared. One must start with facts.

In the metaphor of meteors-as-snow, to what extent is the 'ordinary meaning of [the] word… at odds with the context', as the definition of metaphor suggests it must be? Snow is not starstuff, but it looks like it – and it falls heavy, white, unrelenting. Dance similarly depends on context. An entire poem, if it is organically unified, can therefore be called a metaphor. I would argue that astronomical signs, with their existence as both visual signifier and sidereal signified, offer an intriguing opportunity for this so-called 'unified' symbol of metaphor. In the *Poetics,* Aristotle adds to this meaning, defining metaphor as the act of giving a name to something that had been nameless ('the ship *plowed* the sea').[44] When aimed at the largely unexplored sky, metaphor takes on the specific function of not only the literal, visual representation of a wordless event (the meteor storm), but also a subjective one as well (fear, awe, stability). And since the view of the sky is traditionally an excised

[42] Preminger and Brogan, *Princeton Encyclopedia*, p. 764.
[43] The thing meant – purport, underlying meaning, or main subject of the metaphor.
[44] Preminger and Brogan, *Princeton Encyclopedia*, p. 762.

one, it also serves to unify earth with sky, eye with star, self with Universe. In a world driven by empirical bases, metaphor allows access to the subjective by allowing for imaginative comparisons, making it attractive to the observer, especially when faced by a phenomenon that results in feelings of uselessness or diminishment.

In Bowling Green, Missouri, two curious sky-watchers similarly use extended metaphorical language to understand the storm:

> We were awakened, and told that the stars were falling… knowing that the individual who awakened us, was a person of observation and science, we instantly hurried… for the purpose of witnessing a spectacle so extraordinary.[45]

Ironically, it is the cool-headed 'person of observation and science' who informs the anonymous couple that the stars 'were falling'. Still, these observers know little scientific vocabulary, and cannot find any language suitable to the event; they don't even report to Olmsted what the 'person of observation and science' tells them, so presumably it cannot be reproduced or (like Akin's alkaline theory) it just isn't readily believable, even to the easily swayed amateur. They can't find language for the signifiers they witness; they cannot rightly testify and like Akins, admit it openly:

> The most perfect master of language would fail of conveying to others a full picture of this extraordinary and uncommon appearance, and vain would be his attempt to express the sensations of its beholder.[46]

This Missouri couple (the 'we' remains constant throughout the narrative) defines 'the most perfect master of language' as a theoretical entity who could give a 'full picture' that would include not only the 'sensations' of the writer, but also of the 'beholder' as well. This 'full picture', which would include both objective representation AND subjective depth is akin to the idea of metaphor as unifying symbol. And it is an attractive power to 'master'. Even so, they assure us that even this imaginary 'master' would 'fail'(!) – there is NO way to fully represent this event as it is truly

[45] Olmsted, 'Observations on the Meteors', p. 381.
[46] Olmsted, 'Observations on the Meteors', p. 381.

experienced. This is the subjective denial of objective science: the 'I' in 'science' is always a small one.

Unlike the scientist, these observers are interested in both the representation of the physical event, and of the subjective feeling it instills within them – the 'sensations of its beholder'. This is a far cry from 37 degrees north-by-northwest in the neck of Leo. The onus here is placed not on the scientific explanation (which, in the form of the man, quietly vanishes into the background of the narrative), but on capturing the awesome moment as it 'appears' and is experienced. The challenge is how to 'express' the sensations of an *individualized* beholder in the face of a common event horizon. This is some of the reasoning behind Olmsted's call-for-papers. Since Olmsted can't speak for others, he invites their observations to craft a collective, subjective experience in a very scientific manner.

But in the absence of any real scientific language (at least none they choose to reproduce), the Missouri couple proceed to, of all things, recite poetry:

> There was a grand, peculiar, and indescribable, gloom on all around – an awe inspiring sublimity on all above
> the sanguine flood
> Rolled a broad slaughter o'er the plain of Heaven,
> And Nature's self did seem to totter on the
> brink of fire![47]

When faced with the sheer abstraction of this astronomical event, it is *poetic* language which proves to be the most helpful in decoding the strange light raining down upon their heads. Since the meteors cannot be physically measured by them (other than in general terms of space and time), empirical language is of no use, so the writers deduce what they are seeing by finding other words to substitute for their own absent ones. They explain their turns in thought:

> Forcibly we were reminded of that remarkable passage in Revelations, which speaks of the great red dragon, as drawing the third part of the stars of heaven, and casting them to the earth; and

[47] Olmsted, 'Observations on the Meteors', p. 382. Because of the strange nature of this poem and the way it is placed in the text, I at first thought it was a quote, but research and consultation has yielded nothing: it appears to be original.

> if it be a figurative expression, 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.[48]

Unlike previous attempts at alkaline halides and degrees, this account tells not only how it looks, but how it feels. The passage they are referring to is in Revelation:

> The third angel blew his trumpet, and a great star fell from heaven, blazing like a torch, and it fell on a third of the rivers and on the springs of water. (Revelation 8:10)[49]

The couple seems only marginally convinced that what they allude to is indeed not actually happening, but they are careful to couch their description: 'if it be a figurative expression'. This is a remarkable bit of code switching: no longer is the Biblical word literal, but like the metaphor they use it for; it is figurative, and only descriptive for *other* things.

This argument for the Bible as figurative has an earlier genesis with a more famous astronomer – Galileo:

> I think that in discussions of physical problems we ought to begin not from the authority of scriptural passages, but from sense-experiences and necessary demonstrations; for the holy Bible and the phenomena of nature proceed alike from the divine Word… It is necessary for the Bible, in order to be accommodated to the understanding of every man, to speak many things which appear to differ from the absolute truth so far as the bare meaning of the words is concerned. But Nature, on the other hand, is inexorable and immutable; she never transgresses the laws imposed upon her, or cares a whit whether her abstruse reasons and methods of operation are understandable to men. For that reason it appears that nothing physical which sense-experience sets before our eyes, or which necessary demonstrations prove to us, ought to be called in

[48] Olmsted, 'Observations on the Meteors', p. 382.
[49] Bible. RSV (Iowa Falls, IA: World Bible, 1971).

> question… upon the testimony of biblical passages which may have some different meaning behind their words.[50]

This of course got Galileo into a spot of trouble himself, but hundreds of years later in Missouri, it seems to be borne out. Galileo continues:

> I think in the first place that it is very pious to say and prudent to affirm that the holy Bible can never speak untruth – whenever its true meaning is understood. But I believe nobody will deny that it is often very abstruse, and may say things which are quite different from what its bare words signify. Hence in expounding the Bible if one were always to confine oneself to the unadorned grammatical meaning, one might fall into terror.[51]

In the Missouri account, the remarkable qualifier 'if it be' not only expresses doubt at the Biblical word (even in the face of seeing its seeming manifestation of 'terror' before them) but also allows them an out should the Dragon indeed be real. And since it is metaphor, the comets may mean *both*, allowing for such multi-faceted (albeit ideologically wishy-washy) readings.

In fact, the Missouri couple's experience was by no means unique as many saw this selfsame 'great red dragon'. In Frederick, MD, 'Mr Virgil Barber, Frederick Citizen' starts in similar terms of awe: 'Yesterday morning I observed the most brilliant phenomenon of nature I ever witnessed'.[52] He goes on:

> one of these in the direction of NE near the star Cor Caroli, assumed the form of a serpent with the head very distinct, and a protuberance in the middle of the body. It writhed… .[53]

The watcher starts with co-ordinates, but moves to a more physical (yet still metaphorical) description in the form of deified personification: it is

[50] Galileo Galilei, 'Letter to the Grandduchess Christina', trans. Stillman Drake., in Frederick E. Mosedale, ed., *Philosophy and Science: The Wide Range of Interaction* (Englewood Cliffs NJ: Prentice-Hall, 1979), pp. 23–24.
[51] Galilei, 'Letter to the Grandduchess Christina', p. 23.
[52] Olmsted, 'Observations on the Meteors', p. 375.
[53] Olmsted, 'Observations on the Meteors', p. 375.

a snake. Another anonymous entry echoes this, and goes so far as to sketch a representation of it which the *Journal* reprints (see Fig. 2).[54]

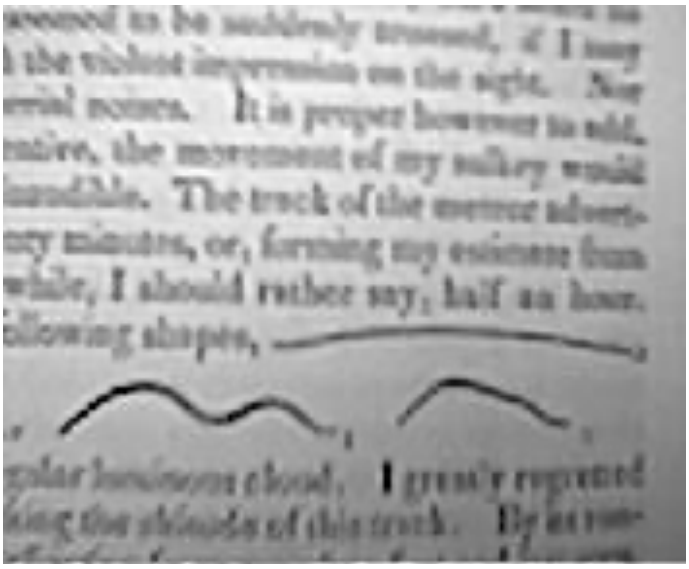

Figure 2. Sketch of the Leonids from *Silliman's Journal*

By drawing it, the writer half-succumbs to the idea that there isn't a subjective language for him to use. It *could* be just a squiggly line, but it also is the Great Snake, filled with meanings of fear and apprehension.

In Portland County, Trumbull, MO:

> A luminous body was distinctly visible in the north east, for more than an hour. The hon. Calvin Pease informs me that he discovered it at 4 o clock, near the star Alioth, in Ursa Major; that it was then very brilliant in the form of a *pruning hook*.[55]

This observer fixes his subject in time and date and space, then is allowed to employ his own impression through metaphor – and, like the Dragon,

[54] This is an amateur photo taken by the author of the drawing as it appeared in the actual text; the paper itself is too fragile to be photocopied or scanned. It is a remarkable image – compare it to the hieroglyph for 'enemy' in Chapter 4.
[55] Olmsted, 'Observations on the Meteors', p. 380.

it is a threatening image, albeit more unconsciously so.[56] In upstate New York:

> at about quarter past 5 o'clock we saw a star shoot from the zenith, about 2 or 3 points westward of N, which in its descent, showed a line of fire, the color of fish blood… and actually assumed the form of a serpent. It lay upon the firmament, we say ten minutes, others say twelve, and then it struck off it seems to the west, and rolled up its coils.[57]

This observer, an 'Old Country Man', certainly offers the most imaginative version yet – not only does the 'serpent' strike and roll, but its 'descent' is a 'line of fire, the color of fish blood'. Instead of behaving like Lincoln's deacon and simply shouting 'The End is Nigh', this man uses metaphor to *suggest* it: serpents and fish blood and fire are *not* innocent connotations. This may belie some doubt on the part of the mysterious 'Old' man's, but it also makes his observation stronger. By beginning with the tenor of the star fixated in relative time and space (a much more empirical source than a line from the Bible), his account takes on more validity. In the end, his account (like others) gets rejected because of its existence outside of the communal norm (determined by relative *likeness*). It thereby shows the limits of where scientifically drawn metaphor can reach. For (scientifically) better or worse, it is certainly *imaginative*.[58]

[56] At Niagara Falls: 'a large luminous body, like a square table was seen nearly in the zenith, remaining for a time nearly stationary; and from this were emitted large streams of light' (Olmsted, 'Observations on the Meteors', p. 401).
[57] Olmsted, 'Observations on the Meteors', p. 390. Fish blood is dark brown/dark red.
[58] Some more, interesting claims; from Hudson, NY: 'The shooting stars were followed by a peculiar odor observed by the company (four men) which was compared to the smell of sulphur, and another to that of onions' (Olmsted, 'Observations on the Meteors', p. 384).