# ROCKS IN YOUR HEAD

**The history of meteor research is a lesson to science on the value of eyewitness reports**

by *Greg Taylor*

On the 15th of February, 2013, a meteor tore through the sky above the southern Ural region of Russia at a speed of roughly 40,000 miles per hour. As it descended to an altitude of about 15 miles above the city of Chelyabinsk, the massive air pressure being exerted on the 7000 ton object caused a spectacular air-burst – since estimated as the equivalent of a 500 kiloton explosion – that blew in doors and shattered windows in the city below.

We all believe that this incident occurred as described – not so much on the basis of 'hearsay' testimony from witnesses, but instead mainly because of the high number of Russian vehicles that now carry dash-cams. Unlike the Tunguska blast of a century previous – which remains an event shrouded in mystery – the Chelyabinsk fireball was filmed from multiple angles for much of its short but violent life, from its initial appearance to the later shockwave which

threw amateur videographers to the ground in fear. What's more, we also happily believe that a rock from space caused the incident, because through science we have come to understand and accept the fact that rocks from space, of various sizes and shapes, regularly bombard our planet.

It therefore comes almost as a shock to find out that the cosmic origin of meteors has only been an accepted fact in Western science for barely two centuries. Indeed, when Yale chemistry professor Benjamin Silliman proposed an extraterrestrial source for a meteor that exploded over the town of Weston in 1807, Thomas Jefferson is famously claimed to have retorted "I would more easily believe that [a] Yankee professor would lie than that stones would fall from heaven." As it turns out, the exact quote may be apocryphal – an embellishment by Silliman's son. But there is little doubt that, at that time, Jefferson was skeptical about the provenance of the Weston meteorite, writing that…

> …a thousand phenomena present themselves daily which we cannot explain, but where facts are suggested, bearing no analogy with the laws of nature as yet known to us, their verity needs proofs proportioned to their difficulty. A cautious mind will weigh well the

The Chelyabinsk fireball



> opposition of the phenomenon to everything hitherto observed, the strength of the testimony by which it is supported, and the errors and misconceptions to which even our senses are liable.[1]

At the time, while sightings of fireballs streaking across the sky were common enough that they were accepted by science as occurring, they were believed to be a still-mysterious atmospheric phenomenon similar to lightning, unconnected to tales of rocks falling from the sky (indeed, the word meteor comes from the Greek word for 'atmosphere', hence the naming of the profession of 'meteorologist'). One account attributed their appearance to "the fermentation of acid and alkaline bodies which float in the atmosphere…when the more subtle part of the effluvia are burnt away, the viscous and earthy parts become too heavy to be supported by the air, and then they fall." Another theory suggested that meteors were "a collection of nitro-sulphureous and fiery vapors, into a sort of a rolling globe, or whirlwind of fire."[2]

Jefferson's own leaning toward the 'atmospheric' assumption about meteors – and his skepticism that rocks could fall from the sky – is evident in a question he posed concerning the Weston meteorite: "is it easier to explain how it got into the clouds from whence it is supposed to have fallen?"

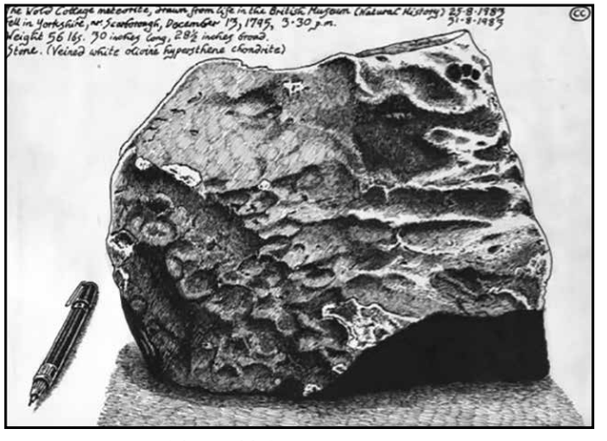
Jefferson's view, however, would soon be a relic of the past. Just thirteen years before the Weston meteorite fall the German physicist Ernst Chladni had published *On the Origin of Ironmasses*. In studying detailed reports of both fireballs and stone falls, Chladni noticed numerous similarities between the cases, and concluded that the phenomena were linked. He theorized that fireballs were falling stones that grew incandescent due to the heat energy generated via friction with Earth's atmosphere. Like Copernicus's 'heretical' heliocentric model, Chladni's intelligent work sparked interest from academic colleagues in private, but received little support in public.[3]

Just a year later, however, a stone three feet across plummeted from the sky in the United Kingdom, plunging into the earth not far from Wold Cottage, the home of magistrate Major Edward Topham, a well-known public figure. Major Topham gave an account of the incident in James Sowerby's *British Mineralogy*, published in 1804:

> When the stone fell, a shepherd of mine, who was returning from his sheep, was about 150 yards from the spot; George Sawden, a carpenter, was passing within 60 yards; and John Shipley, one of my farming servants, was so near the spot where it fell, that he was struck very forcibly by some of the mud and earth raised by the stone dashing into the earth, which it penetrated to the depth of twelve inches, and seven afterwards into the chalk rock – making in all a depth of nineteen inches from the surface.
>
> While the stone was passing through the air…numbers of persons distinguished a body passing through the clouds, though not able to ascertain what it was: and two sons of the clergy man of Wold Newton saw it pass so distinctly by them, that they ran up immediately to my house, to know if anything extraordinary had happened.
>
> …no circumstance of the kind had ever more concurrent testimonies; and the appearance of the stone itself, while it resembles in composition those which are supposed to have fallen in various other parts of the world, has no counterpart or resemblance in the natural stones of the country.

Topham was acutely aware of the controversial nature of such incidents, and thus "as a magistrate, I took [the witnesses] accounts upon oath", noting that he would have no truck with those who disbelieved the event had occurred as he had stated. "I mean not to enter into any literary warfare with those sceptics, who think it






The Wold Cottage Meteorite

much easier to doubt every word of this account than to believe such an event could take place," he remarked. "There is no shorter way of disposing of any thing than to deny or disbelieve it". And he felt compelled to add a comment about one particular proposed explanation for falling stones, asking "what projectile force could throw a stone of 56 pounds in weight from any volcano upon earth to the spot near my house [in Yorkshire] where the stone fell?"

When Chladni's *On the Origin of Ironmasses* reached England in 1796, the Wold Cottage stone was on display in Piccadilly Circus, where the public were willingly paying a shilling each to view the curiosity.[4] Interest in the mystery was building, and Sir Joseph Banks, president of the Royal Society, commissioned a chemical analysis of stones that had been seen falling from the sky. The chemists involved identified common components, "including 'a coating of black oxide of iron' (fusion crust), 'curious globules' (silicate inclusions called chondrules) and a high nickel content in the iron, all of which distinguished their samples from terrestrial rocks."[5]

And yet, the Royal Society was still cautious enough about the research that they adjusted part of the title of the paper – "Observations on Certain Stony and Metalline Substances which Have Fallen at

Different Times on the Earth" (1802) – to "…Substances which *Are Said to Have* Fallen…" [my emphasis]

But the falling stones would not be denied. In the year immediately after this paper was published, the French village of L'Aigle, not far west of Paris, was pelted by thousands of rocks from the sky after a brilliant fireball had crossed the sky and exploded in three massive detonations. Upon hearing of the event, the French Academy of Sciences dispatched a young scientist by the name of Jean-Baptiste Biot to investigate. His meticulous investigation of "without a doubt the most astonishing phenomenon ever observed by man" included interviews with eye-witnesses, a mapping of the debris field, and comparisons of the rocks to the local mineralogy. It was enough to be a turning point in the debate over the origin of falling rocks, and subsequent meteorite falls – such as the one over Weston that sparked Jefferson's incredulous response – only helped to reinforce the veracity of eye-witness testimony that stones did indeed fall from the sky.

After the L'Aigle meteorite fall, the historian Eusebius Salverte criticized the way in which scientists had willingly refused to accept a conclusion that had been long been accepted by people of previous ages:

> The ancient historians all make frequent mention of the productions of stones [fallen from the atmosphere]. No doubt was maintained respecting them in the Middle Ages; but the difficulty of accounting for them induced us not only to suspend our belief until called forth by more regular observation, which was very prudent, but also, which was less reasonable, to carry with us in this research a predetermination to see nothing, or to deny what we had seen.

As the saying goes, science advances one funeral at a time, and despite these breakthroughs, it would not be until the 1850s that the extraterrestrial origin of meteorites would finally come to be accepted as an established scientific fact.



## 'Pure Fantasy'

It says something about the resistance of scientists to anomalistic eyewitness reports then, that two hundred years after this controversy erupted, another mystery concerning meteors continues to linger and be debated: that eyewitnesses have sometimes reported 'hearing' fireballs at the same time as they are seen, despite it being an 'impossibility'.

For example, a number of witnesses who watched an impressive fireball tear through the sky over England on the 19th of March, 1719 reported hearing it make a hissing sound as it passed overhead:

> I discern'd in the sky a large ball of fire, at about 20 or 25° height from the horizon, and bearing about W. and by N. or W.N.W. when I first saw it: It seem'd to be as large as the Moon at Full, with a pale blewish Light, and to have little motion; but in a moment it was thrown into the shape of a common meteor, the head diminishing 'till it was all turn'd into a long stream of light, which…made so strong a light while it was in its greatest extent, that for a moment the Moon, which was above a day past the first quarter, and all the stars, seem'd to disappear by the superiority of this new light; and at that moment one might have read the smallest print by it. *While it was throwing itself into this beautiful stream, I thought I heard a noise of hissing,* like what is made by the flying of a large rocket in the air, but I heard no other noise.[6] [my emphasis]

The famous and influential astronomer Edmund Halley (whom Halley's Comet is named after) was quick to dismiss these claims as "pure fantasy". Halley's reasoning was based in hard science: from various ground observations of the bolide's flight, he had been able to triangulate the height of the fireball. At more than 60 miles distant, Halley noted that it would have been impossible for anybody to hear the fireball at the same time as seeing it: as sound travels at 'only'

around a fifth of a mile per second, it would have taken some five minutes to hear anything related to the event.[7]

In 1784 former army surgeon (and Secretary of the Royal Society) Thomas Blagdon gathered a number of similar reports in connection with a spectacular bolide that had been seen over Scotland, England and Europe a year previously. Blagdon too was baffled by these alleged hissing sounds heard coincident with the sighting of the fireball, and suggested that they might best be explained psychologically, as being the result of "an affrighted imagination". He was, however, respectful enough of the testimony of the witnesses to not reject it outright, admitting that he would rather "leave it as a point to be cleared up by future observers."

A half century later, during the great Leonid meteor shower of November 13th 1833, many people again reported anomalistic sounds accompanying the largest fireballs: hissing noises "like the rushing of a sky rocket" and slight explosions. But in this case, a scientist went against the established 'truth' of the matter. Denison Olmsted, Professor of Mathematics and Natural Philosophy at Yale, found himself at odds with Halley's and Blagdon's conclusions, noting that the descriptions of the sounds occurred "too uniformly, and in too many instances, to permit us to suppose that they were either imaginary or derived from extraneous sources."

But Olmsted's opinion continued to be in the minority within scientific circles. One reason for this was the capricious nature of the phenomenon: of two people standing beside each other, often only one might report hearing the sounds, lending credence to the idea that it was a psychological effect. Additionally, the accepted science of the time contained no mechanism that would allow for this 'instantaneous sound' phenomenon to be possible in the first place.

Nevertheless, there were aspects of the testimony that should have given pause to any serious scientist. Perhaps the most persuasive of these was that many witnesses reported that *it was the sound itself that caused them to look up* and observe the fireball. For instance, one



witness wrote that "while walking in my garden my attention was attracted by a distant hissing sound, and on looking up I saw the meteor". In some cases this even extended to people within buildings hearing the sound, causing them to move to a window or outside to look for the source of the noise.

But it was an advance in science that would provide the real key to opening scientists' minds.

## Ethereal Sound

For the likes of Edmund Halley, witness accounts of 'instantaneous' sound propagation from meteors could be dismissed out of hand, as the science of his time could supply no mechanism that would make this possible. However, between 1886 and 1889 Heinrich Hertz conducted a series of experiments that would prove the reality of 'electromagnetic waves' (which had been theorized by James Clerk Maxwell during the 1860s and 1870s).

This discovery would lead to some of the first real attempts by scientists at explaining – and accepting – meteoric sounds. After a spectacular fireball over Texas in 1917 elicited more eyewitness accounts of simultaneous sounds, Professor J.A. Udden of the University of Texas suggested that electromagnetic waves might provide the solution:

> Several parties who saw the bright body at a distance of about 200 miles (320 km) or less, report hearing a swishing or buzzing sound, which seems to have been simultaneous with the appearance of the light.
>
> If these observations are not subjective, the cause of the sounds may perhaps be sought in either waves that, on meeting the earth, or objects attached to the earth, such as plants or artificial structures, are in part dissipated by being transformed into waves of sound in the air.

Udden was still swimming against the tide of mainstream scientific opinion though. Even after the turn of the 20th century – with Hertz's electromagnetic wave theory now an intrinsic part of physics – the famous astronomer W.F. Denning would note that…

> …hissing and similar noises…may be dismissed as imaginary… [an] observational illusion… They are either imaginative or due to causes not directly connected with the phenomena observed.

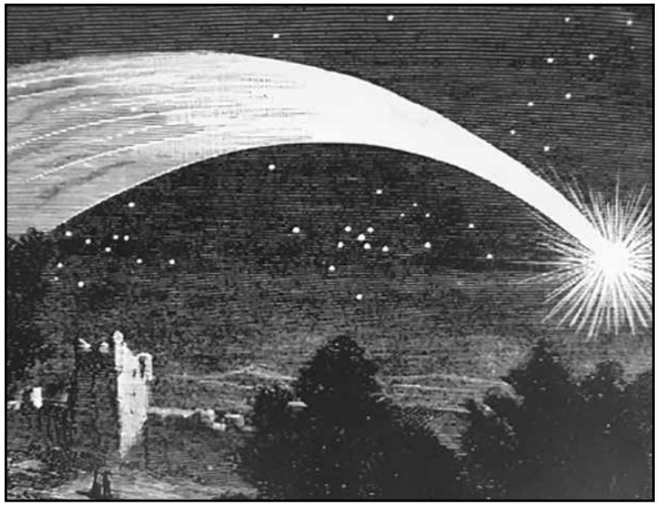
Even later, in an article in *Popular Astronomy* in 1932, C.C. Wylie, Professor of Mathematics and Astronomy at the University of Iowa, illustrated once again the dangers of using the words "without doubt" when he wrote that "the explanation [for meteoric sounds] is without doubt psychological."

Such negative opinions by acknowledged meteor experts "led many meteor scientists to shun the subject". One exception was prominent meteor scientist Harvey Harlow Nininger, who in 1939 wrote that perhaps the mystery was "a problem in physics rather than psychology". He was persuaded by the many cases on record "where the informants insist that the sound attracted them from behind or within buildings, and, in some instances of daylight meteors, the sound was commented upon before any light was seen or known about."

Nininger put forward a possible solution to the mystery, telling of how one "Mr. Elmer R. Weaver of the U.S. Bureau of Standards suggested to me in conversation that possibly ether waves are transformed into sound waves upon striking objects in the environment of the observer." He pointed out that it was common knowledge among radio engineers that powerful radio transmissions were sometimes reproduced by objects in the environment that acted as receivers – perhaps that was what was happening here?

Nininger also attempted to give a name to the phenomenon, suggesting that it be called "ethereal sound". However, the term that





would stick was proposed in the following year by Professor Peter Dravert of Omsk University: "electrophonic fireballs".

The problem remained, however, that at this stage there was still no actual evidence that bolides emitted radio signals. British astronomer Gerald Hawkins – perhaps best known for his influential research on astronomical alignments for ancient sites such as Stonehenge – was curious enough to dedicate some time to researching the idea in 1958, conducting a search for radio emissions from meteors at several specific frequencies, but he found nothing.

At this point, however, there was now enough ongoing interest in the mystery that a unique research group became involved: the U.S. Department of Defense, who awarded a contract to the Rand Corporation to study the phenomenon further. Though, it seems likely that they were motivated more by the Cold War and the threat of Soviet nuclear missiles, rather than any particular interest in the mysteries of meteors, expressing the hope that a better understanding of the topic might lead to "new techniques for determing the size, nature and path of any large body entering the earth's atmosphere". Enough said!

Despite presenting 88 references and a catalog of 41 observations in a 65 page report, the Rand Corporation study could reach no firm conclusion on the mechanism for the production of these sounds from meteors, except for attributing them to an "electromagnetic disturbance" and recommending that "the properties of the plasma sheath and ionized wake [of the meteor] should be the subject of further research".

But still, many meteor scientists – perhaps unconvinced by the Rand report's inability to propose a solid mechanism to explain the phenomenon – continued to stick with the psychological explanation for witness reports of electrophonic sounds from fireballs.

## Keay to the Mystery

As with the L'Aigle meteorite fall – a momentous event which provoked the interest of a meticulous scientist and led to scientific acceptance of the idea that stones fell from the sky – one particular fireball event led to the involvement of another meticulous, open-minded scientist who would bring widespread acceptance to the study of the electrophonic meteor phenomenon.

About an hour and a half before sunrise on the morning of April 7th 1978, night suddenly turned to day near the city of Sydney, Australia, as a massive fireball crossed the sky, reaching a maximum brightness of at least -15 magnitude – so bright that some observers were temporarily blinded by it. In 1958 Soviet scientist Professor I.S. Astapovich had noted after studying witness reports that "only bolides brighter than -9 absolute visual magnitude produce sustained electrophonic sounds", so it is of little surprise that many witnesses on the ground in Sydney reported hearing strange noises while viewing this meteor overhead (the lower the number, the greater the visual magnitude).

Professor Colin Keay of the University of Newcastle (Australia) was intrigued when he read this flood of reports, though he admits



that, like many others, he at first "rather fashionably dismissed these as a psychological effect". However, he was "persuaded otherwise" by a number of witness reports which clearly noted that the sound was heard before the fireball was seen.

> At Rose Bay, Sydney, 20km from the ground track of the bolide, S. McGrath "Heard a bang before seeing the light. It was like a person in the next apartment slamming a door like a screen door: rather rattley but not loud." This witness had time to get to a window and watch the bolide recede and disappear.
>
> At Edgecliff, Sydney, 20km from the ground track, A. Hayes "Heard a noise like an express train or bus travelling at high speed. Next an electrical crackling sound, then our backyard was as light as day."
>
> At Vales Point, 40km from the ground track, J. Ireland "Heard a sound like an approaching vehicle and saw a flash of light (from behind his right shoulder) as everything was lit up like daylight."
>
> At Kotara, Newcastle, 40km from the ground track, N. Jones heard a noise like a "phut" when the bolide flared, but "It was not loud enough to wake anyone." However a friend standing by the door on the other side of their car heard nothing.
>
> Other impressions of the sound simultaneous with the sighting were "a loud swishing noise"; "a humming sound like a transformer or distant siren"; "like steam hissing out of a railway engine for a count of about ten"; "a swishing sound like the onset of an unexpected high wind"; and "a low moaning, whooshing transcribable on a tape recorder."[8]

To Keay, it was obvious from the witness reports that "the psychological explanation was not realistic and a physical explanation had to be

sought." It began a quest that became a life-long obsession for Keay, right up until his passing in August 2015, and which helped bring electrophonic meteor sounds into the bounds of accepted science.

Keay's research found that for about ten percent of those who witness a very luminous meteor fireball, "the mental impression is heightened by strange swishing, hissing and popping noises coincident with its passage across the sky".[9] He theorized that the answer to this mystery was in VLF (very low frequency) electromagnetic waves, suggesting that they were emitted by bright fireballs, and – following other researchers such as Udden, Weaver and Nininger – that this energy, traveling at the speed of light, not sound, was then "transduced by mundane objects such as frizzy hair or grass or pine needles" in the vicinity of the observer, thus producing the anomalous 'instantaneous' sounds.

Putting forward a theory  is easy, but providing actual evidence is a little more difficult – meteors are unpredictable, and our environment is awash in electromagnetic radiation. But in 2014 – more than three decades after Keay first published his thoughts – scientists might have accidentally unearthed some. Researchers at the University of New Mexico were searching for mysterious events called radio bursts in 11,000 hours of data recorded by an observatory in New Mexico. These radio bursts manifest as points of radiation in images, but during their analysis the researchers also found ten 'smudges' right across the sky, similar to that of a fireball path, at low frequencies.Intrigued, they consulted a NASA telescope survey that records meteors, and found that these smudges did indeed correlate with known fireballs.[10]

And Keay himself has demonstrated that his transduction hypothesis works: in a laboratory, he created rustling sounds in objects including hair, wires, pine needles, and aluminium foil simply by exposing them to VLF radiation.

More difficult to figure out though is the mechanism that might be *producing* these low-frequency waves. As one paper on the topic put it: "the question of the generation mechanism of low-frequency electromagnetic radiation from meteors is nontrivial":



> The most accepted theory of meteor ELF/VLF emission was introduced by Keay [1980a] and theoretically refined by Bronshten [1983]. The EM waves are produced by trapping and tangling of the Earth's magnetic field in the turbulent plasma wake of an ablating meteoroid. The main prerequisite of the theory is that the meteor plasma should enter the turbulent flow regime. This means that the theory is applicable only for slow and luminous bolides (absolute magnitude brighter than 12m), which are penetrating deep into the atmosphere (below heights of 20 km), i.e., type 1 electrophones.
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> In order to explain type 2 electrophones, Keay [1992b] suggested a refinement to his theory in which the VLF radio burst is produced by explosive disintegration of a fireball. According to this theory, even the meteors dimmer then 6m are capable of producing electrophones.
>
> Recently, an alternative theory to explain type 2 electrophones was suggested by Beech and Foschini [1999]. The theory proposes that the charge separation takes place during the airburst of the meteoroid due to propagating shock wave through ionized meteor plasma. Rapid and strong electric fields are produced by the charge separation and they produce low-frequency EM radiation.[11]

Another more recent suggestion is that fireballs trigger unidentified, powerful atmospheric phenomenon at the boundaries of the ionosphere's layers. The idea that electromagnetic bursts might be produced by meteors interacting with the ionosphere has some support by observations of 'sprites' that appear to have been triggered by the entry of meteors into the atmosphere. The basic idea behind this theory might be supported by the fact that another atmospheric phenomenon – the aurorae – have also been found to produce anomalous sounds similar to electrophonic meteors.

Still, at the time of writing none of these theories has been proven, and so the mechanism that produces the VLF waves during the passage of fireballs across the sky remains a mystery.

## Et tu, Spacecraft?

It's interesting to compare the history of reports of, and research into, electrophonic meteors with that of the UFO phenomenon. Witness reports of electrophonic meteors were dismissed by scientists as nonsense, just as UFO sightings still are. Electrophonic meteors were said to exhibit impossible behaviour (instantaneous sounds), as do UFOs (physically impossible manoeuvres). Both occur suddenly, without notice, usually to witnesses alone or in small groups in remote (dark) areas and/or in the middle of the night who provided 'anecdotes' rather than 'evidence'. Both are also capricious, in the manner in which multiple witnesses in the same group can report different things. And the mechanism or cause behind each phenomenon remain mysteries as well.

It's rather ironic, then, that Colin Keay, alongside his research into electrophonic meteors, was also involved with organized skepticism – which, given the similarities between UFOs and electrophonic meteors noted above – can only have led to occasional moments of cognitive dissonance. In a podcast interview[12] with noted Australian skeptic Richard Saunders about electrophonic meteors, Keay was moved to make a comment that is a staple in many UFO debates/arguments. "Some very notable people have reported them…so many people can't be wrong you might say," Keay noted. Saunders responded with a common skeptical retort to that claim, saying "well usually in the sceptical field we say it doesn't matter, because a lot of people can be wrong." Keay then defended his statement by replying, "Yes but when a lot of people with observational experience report it, you can't discount it."



Keay is not the only skeptic to have 'taken the side' of the anomaly in this case. Respected science journalist and UFO skeptic Jim Oberg assisted Colin Keay in investigating another "remarkable fact" related to electrophonic meteors: that witnesses have also reported these sounds being emitted by space shuttles during re-entry into Earth's atmosphere.

> The spectacular reentry of the Space Shuttle Discovery was observed by many Texans in the pre-dawn skies. Among these were Ben and Jeannette Killingsworth. As they observed the Space Shuttle streak across the sky, "*they both heard an unmistakable 'swishing noise' as it passed* south of their rural Galveston County home. The sonic boom came several minutes later – *but the swishing sound occurred simultaneously with the visual apparition*… Ben graphically described the sounds as 'like a skier coming down a slope,' but with a rapid fluctuation in loudness, 'about two or three hertz.' Jeannette compared the faint sound to the noise made by a fast boat as it slaps across waves on a choppy lake. 'But there was no motor noise,' she added, 'just a sound like repeated puffs of air through your mouth'."[13]

In the comments to an article on the popular UFO/conspiracy site AboveTopSecret.com, Oberg noted that electrophonic sounds are "a wonderful mystery of nature with a lot to teach serious ufologists", demonstrating that genuine mysteries rejected by orthodox scientists can be solved, if approached in the right manner:

> I think the primary lesson of this recently-validated phenomenon is that the eyewitnesses were right and the know-it-all scientists were wrong in proclaiming they could NOT have experienced what they described because it was contrary to science. Sound familiar?
>
> I don't doubt that Bill Nye would have lectured any witness severely for being over excitable and unscientific in even THINKING that sound could come from a distant fireball. Idiots all, these hicks. But the witnesses were NOT the idiots in this matter.
>
> The second lesson is the value that amateur observers and heretical researchers brought to the subject.
>
> The third lesson is that such "fringe phenomena" CAN succumb to research even over the objections of the scientific establishment, if reliable records and catalogs are compiled and distributed.
>
> Do the field work and do the raw report documentation – and the validation to weed out any unreliable or questionable reports.[14]

Beyond the larger similarities between the areas of research though, it's perhaps worth returning to the detail of these 'impossible' sounds being emitted by spacecraft entering Earth's atmosphere – because, strangely enough, there are numerous similarities with noises reported during UFO sightings. In both cases, a variety of the same sounds have been reported, including humming, hissing, buzzing, swishing and 'rushing wind' noises.



Some of the detailed reports of these sounds illustrate the similarities quite clearly. For example, just as the space shuttle was said to make a "swishing" sound by witnesses Ben and Jeannette Killingsworth (in the account mentioned earlier), and just as a witness to the 2001 Leonids reported seeing "a bright meteor pass by in the SE…It made a kind of swish noise as it passed by", so too do we find UFO reports – such as the following sighting report of Charles Early – that mention this same sound:

> Early was raking leaves at his home in Greenfield Massachusetts, under a clear sky, when *he heard a "swishing noise" as if a wind storm was coming*. He looked up and saw two rings parallel to each other, one on top of the other separated by a distance of about 4 feet. He estimated the diameter to be about 30 feet and described them as "bright, like polished chrome" and tubular.

Compare the italicised part of the report above to a description of the electrophonic sound emitted by the 1978 Sydney fireball (collected by Colin Keay): "a swishing sound like the onset of an unexpected high wind". And beyond the strikingly similar phrasing of the sound made, we also see that – just as with many electrophonic meteor reports – it was this sound that caused Early to look up and witness the object.

So too with another electrophonic meteor account, but this time of a different sound, made by the Murchison meteorite as it flew over Victoria, Australia in 1969:

> [A] lady ... while spending the morning tending her garden, was startled by a hissing noise that reminded her rather strongly *of car tyres being driven over a wet road.* The noise seemed to emanate from a southerly direction and, there being neither cars nor roads nor excessive moisture in that immediate vicinity, she deemed it sufficiently odd to glance up from her gardening and investigate what could be making such a sound.

Compare the italicised portion of the above account to the famous 'close encounter' of Joe Simonton, which began with what the 60-year-old chicken farmer described as the noise of "tyres on a wet pavement", before spotting a silvery object like "two wash bowls turned face to face" hovering just above the ground.

I'm obviously not suggesting that UFO reports are all mistaken meteor sightings. Instead, the question is this: does this suggest that there is a VLF component to some of these unidentified object sightings in which similar noises are heard. And if so, does this suggest a validity to the UFO reports with this component?

Is there any other evidence to support a connection between the phenomena of electrophonic meteors and UFOs? This Australian meteor report contains something interesting:

> The Wiluna Meteorite was observed to fall on September 2, 1967 at 22:46 hrs. Along with sonic phenomena, a fireball was seen. An estimated 1,000 stones fell over an arid sheep grazing area approximately five miles east of the Wiluna Township, Western Australia. Almost the entire town (including people from surrounding stations [ranches]) was gathered in the outdoor movie house when the fireball came over. *They heard electrophonic sounds* – crackling and hissing while the fireball was visible and incandescent. *The diesel generator which powers the town cut out, and when the policeman went to jump in his Landcruiser and investigate, it would not start until well after the fireball was over.*[15]

Engines stopping as an object flies overhead – anybody that has read through UFO literature, or at least watched *Close Encounters of the Third Kind*, will be familiar with this famous aspect.[16] In one well-known case, the 1957 Levelland sightings, there were seven separate reports of "car disablement and subsequent rapid, automatic recovery after the passage of the strange illuminated craft".[17] And in a number of 'engine stoppage' encounters, we find a confluence



of both engine- or electronics-related problems, and anomalous sounds. For example:

> About five kilometres out of town his surroundings were illuminated by an orange hue. *Suddenly the engine stopped and the lights went out. The ignition light on the dashboard failed to come on, and despite efforts the engine could not be restarted.* He steered the car to the side of the road and braked to a halt. Getting out he saw, at fifty metres altitude, an oval shape with three to four "windows". It was stationary, almost directly above the car. It remained motionless for two to three minutes *with a continuous buzzing sound being audible*.[18,19]

Interestingly, during Colin Keay's research into the possible mechanism behind electrophonic meteor sounds, he noted that soldiers in bunkers sited in the vicinity of nuclear tests sometimes reported a "click" sound as the blast occurred, at the same time as "an intense burst of radio emission...of sufficient intensity to burn out electronic equipment".[20]

In fact, once you start reading through scientific papers on electrophonic meteors you find yourself stumbling across all sorts of interesting 'additional' aspects that are bound to make Forteans sit up and take notice:

> Appearance of smell simultaneously with a bright meteor has a similar history. There is one…report mentioning a smell of sulphur, one of ozone, and one of "lightning" (probably also ozone)… The smell of sulphur and onion was reported during the 1833 Leonids. More recently, a "foul metallic, chemical or sulphurous odor" was reported to accompany the flight of the Tagish Lake meteorite in 2000.
>
> Another interesting unusual phenomenon related to an electrophonic fireball: a warm "puff of wind ... towards the end

> of the duration of the sound". Similar tactile phenomena like "oscillations and shaking of the air" or "oppression of air" have been reported since the beginning of the history of electrophonic phenomenon.
>
> [A witness reported that he] woke up and went to a window for no reason, probably because of a "stimulus of some sort".[21]

This is a whole other rabbit hole to go down, so I won't linger on it long in this essay. But those that have read my previous article on sounds heard during paranormal and Fortean encounters ("Her Sweet Murmur: Exploring the Aural Phenomenology of Border Experiences", in *Darklore Volume 1*) will notice that many of the anomalous sounds of electrophonic meteors – buzzing, hissing, swishing, 'rush of wind' – are strangely similar to those reported during 'Fortean' events of all kinds. The addition of the other elements mentioned above reinforces that perception even further. But why would there be any transducing of VLF sounds in Fortean events such as, say, a near-death experience? It seems to suggest we are looking at completely different 'sounds' that just happen to be similar in description. However, if we dig deeper, there is the remote possibility of a common thread.

Neuroscientist Michael Persinger has put forward the (admittedly controversial) theory that electric and electromagnetic fields "can create unstable conditions in the brain, especially the deep portions of the temporal lobes." Persinger suggests that this instability "can lead to hallucinatory experiences which people interpret in terms of their cultural and learning history as well as their private beliefs, so they are interpreted and then seen as spirits, the Virgin Mary, angels, alien spacecraft or ghosts."[22]

In "Her Sweet Murmur" I mentioned the similarities of 'paranormal' sounds to those reported by sufferers of temporal lobe epilepsy – so perhaps there could indeed be some relationship. Is it



possible that electrophonic meteors point the way to a new approach to understanding paranormal experiences, framing them in terms of temporal lobe stimulation? It seems unlikely, but if there's anything that the history of research into meteors should teach us, it's that we shouldn't dismiss anomalies, but instead pay attention to eyewitness reports, look for patterns, think critically, all the while having an open mind to all the possibilities.

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