

Hessdalen Light Phenomena and the Inconsistency of the “Car-Headlight” Interpretation

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Abstract – Some gratuitous criticism attempted to attack research concerning the scientific study of anomalous light phenomena in Hessdalen, Norway, by artfully constructing a castle in the air based on the arbitrary assumption that the “EMBLA 2002” field-study was dedicated to car headlights. This paper summarizes and analyzes in a few essential details the reasons why this “criticism” hasn’t any reason to be considered such, as it is only a well-constructed fake. Some epistemological aspects are treated as well.

Keywords: Hessdalen phenomenon – scientific measurements – para-scientific criticism

NOTE. This paper will appear in German language on the journal *Zeitschrift für Anomalistik*

Introduction

I see that M. Leone’s personal idea of scientific criticism has remained unvaried since 4 years, while his repeated multilingual and multi-mode attacks (Leone, 2003a, 2003b, 2003c, 2004, 2006a, 2006b) concerning my research on the well-known “Hessdalen light phenomenon” show no evolution in his thought, in fact they appear as nothing else than a repeated and monotonous tune, whose scope frankly goes beyond my capability of understanding. This looks much a political move, and in fact it can (just locally) trigger its effects in a public who is not familiar at all with my research and/or who doesn’t even have the intention to. The way in which his new paper (Leone, 2006b) together with its commentary (56 pages in total) by philosopher Gerd Hövelmann (Hövelmann, 2006) appeared on *Zeitschrift für Anomalistik* are not at all the way of what should be called a “scientific debate” (Popper, 1992). Hövelmann, founding his opinion not on my work but on my brief letter appeared on the *Journal of Scientific Exploration* (Teodorani, 2004b) – possibly in good faith – accuses me to be evasive and “authoritatively dogmatic”. My letter on JSE was brief as an obligation by the JSE editor and not as my choice: in that journal the space which I was offered to answer to Leone’s ramblings was less than symbolic. Therefore I try to be more detailed in this article for this German Journal.

True criticism (Popper, 1992), when healthy and rigorously founded, has been and remains the best way to evolve in scientific knowledge and to reach a solid consensus on the effective reality of the investigated facts. This is not the case of the “rebuttal papers” by Leone who, in addition to missing a constructive target, builds up his criticism on wrong and arbitrarily constructed information, assumptions, data analysis and conclusions. I have not particular revelations to give to the readers of *Zeitschrift für Anomalistik* other than resuming the most important counter argumentations, which I make regarding Leone’s annoying repetitions; but here I will also present some details which I have never discussed before in my previous papers concerning Leone’s claims. The discussion that follows will regard the most essential counter-criticism of mine, namely, the reasons why I did study the real light phenomenon and not, contrarily to what Leone did, alleged human artefacts such as car headlights, in this specific case.

Car headlights vs. Anomalous Light Phenomena

Telescopic observation of a light-source produced by car headlights on a hill is only Leone’s witness, which couldn’t be cross-checked with any other visual observations by other witnesses using another small telescope of that kind. This way to collect information does not respond to any fundamental rule of observational scientific methodology, especially because no appropriate recording of this visual testimony is provided. His little telescope should have been equipped with a simple camera. Therefore, in this specific case, Leone’s observation using a telescope is nothing more than a visual witness of ufological level; in this specific case it is a bad witness, as it cannot be confronted with any

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other witnesses than himself. Is this a particularly free and easy way to conceive the scientific method? The vehicle headlamp hypothesis is neither heuristic nor powerful. It is just an ad-hoc construction, in which using an “apparently” correct methodology in the analytic part of Leone’s arguments, the main scope is killing ad-hoc the light phenomenon evidence. Most of all, Leone, who is not probably even sure of the heuristic power of his hypothesis (namely: his pre-planned decision and choice of car head-lights), uses his indemonstrable “visual evidence” in order to corroborate a-priori his subsequent construction.

My collaborators and I knew very well which ones were the car headlights and which one was the true light phenomenon. We took photographs and spectra of both car headlights and the light phenomenon. Leone has confused the lights of a car with the lights of the true phenomenon that, by chance, is seen quite close angularly, but whose intrinsic distance is much different. The presence of a field road in the area was known to me, thanks to prompt and precise information by our Norwegian collaborators (Teodorani, 2004a). The distance of the light phenomenon (9 Km) was deduced consulting maps of the area, comparing our optical data with the radar echoes coming from the hilltop where the light phenomenon was located, and carrying out triangulation procedures – using specific Motorola data scopes – together with geophysicist Marsha Adams (Adams, 2006). Moreover a drastic confutation of Leone’s first distance evaluation (2 Km) of the light phenomenon was given in a further phase by geophysical researchers using proper 3-D map reconstruction software (Nicolosi & Richetti, 2003). It might appear to be reasonable that a person – such as Matteo Leone – who stayed at the observation point of Aspåskjölen for a period of time that in terms of hours was at least a factor 10 less than ours, cannot gain sufficient time to distinguish very frequent car headlights from genuinely anomalous but quite distinctive light phenomena. His methodology of “choice” between the two demonstrated to be superficial and hastened, unless he decided to consider only car headlights on purpose; but I still do not know what was his agenda at that time as well as I do not know what is his agenda now, even if I can suspect it very well. Moreover he never collaborated with us in spite of the fact that we offered to him this possibility all the time he was there. Leone’s conclusions are not supported by any scientific protocol in the way in which he acquired his “data”. Due to this the detailed “data” analysis and interpretation that follow in all of his papers are totally ungrounded.

M. Leone attempts to make the reader think that my research was entirely dedicated to the specific light that he arbitrarily interpreted as car headlights. This is totally false and misleading. An analysis of the many other phenomena that I investigated and recorded in the Hessdalen area and that were seen in different directions, is accurately and completely described in my JSE paper (Teodorani, 2004b) and in many other reports that I published before that. As also others rightly stressed (Strand, 2005), my papers should be read carefully and not only partially. Nevertheless, due to the standard criteria of data repeatability that must be always adopted in science, our line of action was not to prepare a photo-collection of ufological transient prodigies but a specific analysis of data that could be acquired systematically and for a sufficiently long time, namely where the light phenomenon was more recurrent, after we carefully selected – in the years – the signal from the noise. Therefore most of the physical characteristics (structure and time-variability in particular) that I deduced of the optical aspects of the light phenomenon were referred to two events in particular, as they were seen towards the south direction from the Aspåskjölen observing site in the summers of 2001 and 2002, on the second of which Leone constructs his highly questionable argumentations. He then unscientifically generalizes all my research in Hessdalen limiting it to only one evidence, which unfortunately he failed to interpret correctly as well.

My assumption that the stationary light was an isotropic radiator is not a conjecture. This assumption has been accepted as such because the same light phenomenon was occasionally visible by another observer too (Adams, 2006) from a direction that was at least 50 deg in respect to our observing point. But this is even truer after studying the documented multiple-light clustering behaviour of the phenomenon itself (Teodorani, 2004a, 2004b). Very recent research demonstrates that the interaction of plasmas with dust particles produces some sort of “plasma crystals” with the ability of replication, much in a similar fashion as the DNA reproduction (Tsyrovich et al., 2007), while the model which has been adopted in my JSE paper involves a very similar situation: the interaction of a plasma concentration (of probable piezoelectric origin) with water vapour and aerosol dust particles. Clustering implies an approximately spherical symmetry and not a two-dimensional effect occurring on a plane orthogonal to the observer. It is highly improbable that the clustering effect of light balls (demonstrated both from videos and from photos) occurs unidirectional on a (flat) 2-D space (are Hessdalen lights coming from *Flatland*?). It is much more reasonable that it occurs on a 3-D space: in such a case the same light phenomenon can be seen from other directions. And very distant car headlights do not produce on the camera film (or on video) resolved multiple light balls – such as ejection or clustering effects – unless internal reflections in the camera are occasionally produced: but this doesn’t create clusters of lights at all, while secondary artefact lights, if present, are always very far away from the original light source (Teodorani, 2008 – Part I). Anyway, test photographs of car headlights in Hessdalen and elsewhere have never shown internal reflections effects.

On the contrary, all the photometric calculations that Leone carries out are based only on his own conjecture which is uniquely founded on his own sporadic non-recorded observation of a car headlight, which obviously is not an isotropic radiator. His analysis, totally lacking completeness in data collection, shows his preferential “map” of a phenomenon but not its true “territory”: this is bad scientific methodology, because in this way the data are tricked or, at the best, misconstrued. I have had several opportunities – both in Hessdalen and elsewhere – to see that when their intensity is sufficiently strong it is possible to distinguish quite clearly also the light beams produced by car headlights, even if this was not photographed because at that precise moment we were engaged in more important things than tracking cars. But cars were photographed when their beam was orthogonal to the observer, while car head-on lights have been photographed (as a comparative test) indeed only at a later time in Italy in a very similar situation as in Hessdalen: in such occasion light-beams are clearly seen. The anomalous light phenomenon produces no directional beams (see *Figure 1*).

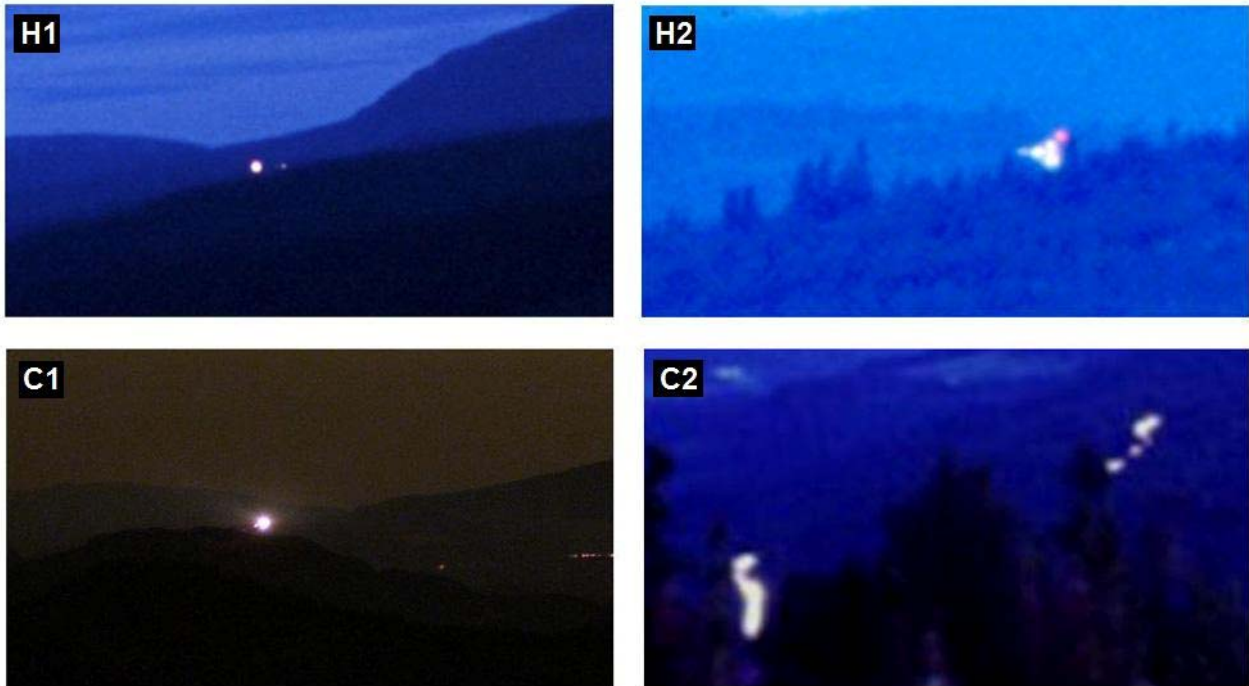


Figure 1. Photos of: **a)** Anomalous light phenomenon taken in August 2001 and 2002 in Hessdalen using a reflex camera and a 100 ASA film (H1: static configuration with one ejection, H2: dynamic and clustered configuration); **b)** Car headlights seen head-on showing light-beams taken in August 2005 in Italy using a high-resolution reflex digital camera (C1: static configuration) and moving car headlights taken in August 2002 in Hessdalen using a reflex camera and a 100 ASA film (C2: dynamic configuration).

Leone claims that I changed my measurements of luminosity. This is legitimate when one shifts from a preliminary report to a more in-depth analysis, only if the given changes are fully coherent with the changes of parameters therein. In fact I do not criticize M. Leone when he changes several times the position and the distance of the road where his car was passing (Leone, 2003a; 2003b). My criticism and irritation here comes only when he strangely obtains always the same result in his luminosity calculations, in spite of his change of several parameters. Maybe James Randi might explain better than me the tricks of this illusionism. I stress this very important aspect to the readers of this Journal, in particular to the physicists/astronomers, who, before forming an opinion only driven by one two-page editorial, should read very carefully all of Leone’s papers, together with my technical papers. Moreover, Leone goes on using a different metric notation than the one which I used. Notations must be unified when discussing a paper, in order to permit an appropriate comparison both of procedural calculations and of final results. On the contrary, only (deliberate?) confusion is generated.

Now let’s try to reproduce the situation that occurred in Hessdalen as seen from the Aspåskjölen observing site (see *Figure 2*). Consider that this is just approximate, but it is that which is sufficient to illustrate what we were often seeing in the area. The car was coming from right and it appeared for a few seconds as a stationary bright light with visible beams, then it passed through the trees alternately disappearing and reappearing. The focal point of the question here is just the position at which the car appeared the first time. We are fortunate to show almost all of this because a photo taken in Hessdalen by Gloria Nobili (in summer 2002) using a Rollei twin-lens reflex camera shows everything as follows: a) the moving car in two different positions, and b) the appearing luminous phenomenon on a hill behind (about 9 Km), which was very close to the car’s apparition point (about 2 Km) only angularly but not in

distance: in reality the point of light phenomenon apparition was much farther (about 9 Km). Of course we do not remember which one appeared first in this photo, but we did record the photo exposure time, which was about 30 seconds. In fact the movement of the car that was recorded in the photo is consistent with the length of the time exposure, and obviously it shows the movement of the car. At the moment in which the car appeared the first time there is no photo recording it, because the photo was presumably taken some tens of seconds later, so the point in which the car appeared has been necessarily reconstructed on the basis of our visual remembering. Who is telling that the light phenomenon is just that car at the start of its visible lighted route doesn't truly hold water, above all because the time that this car would have taken to make the entire route would have been greatly longer than only 30 seconds! But the light phenomenon, which appeared in this photo by chance at the moment of car passage, was much more distant, and its photo-recorded intensity is (in the case of this photo) weaker than the one of the car. Of course its intensity is weak, not only because of the greater distance (luminous power decreases as the inverse of the squared distance), but above all because the light phenomenon – as its intrinsic characteristics – doesn't shine in a constant way like the car does (unless it passes through trees), but it pulsates irregularly, and even if in some instances the light phenomenon appeared to brighten much more than the car, this lasted only a few seconds, therefore the overall number of photons reaching the camera film was relatively low (in this specific photo).

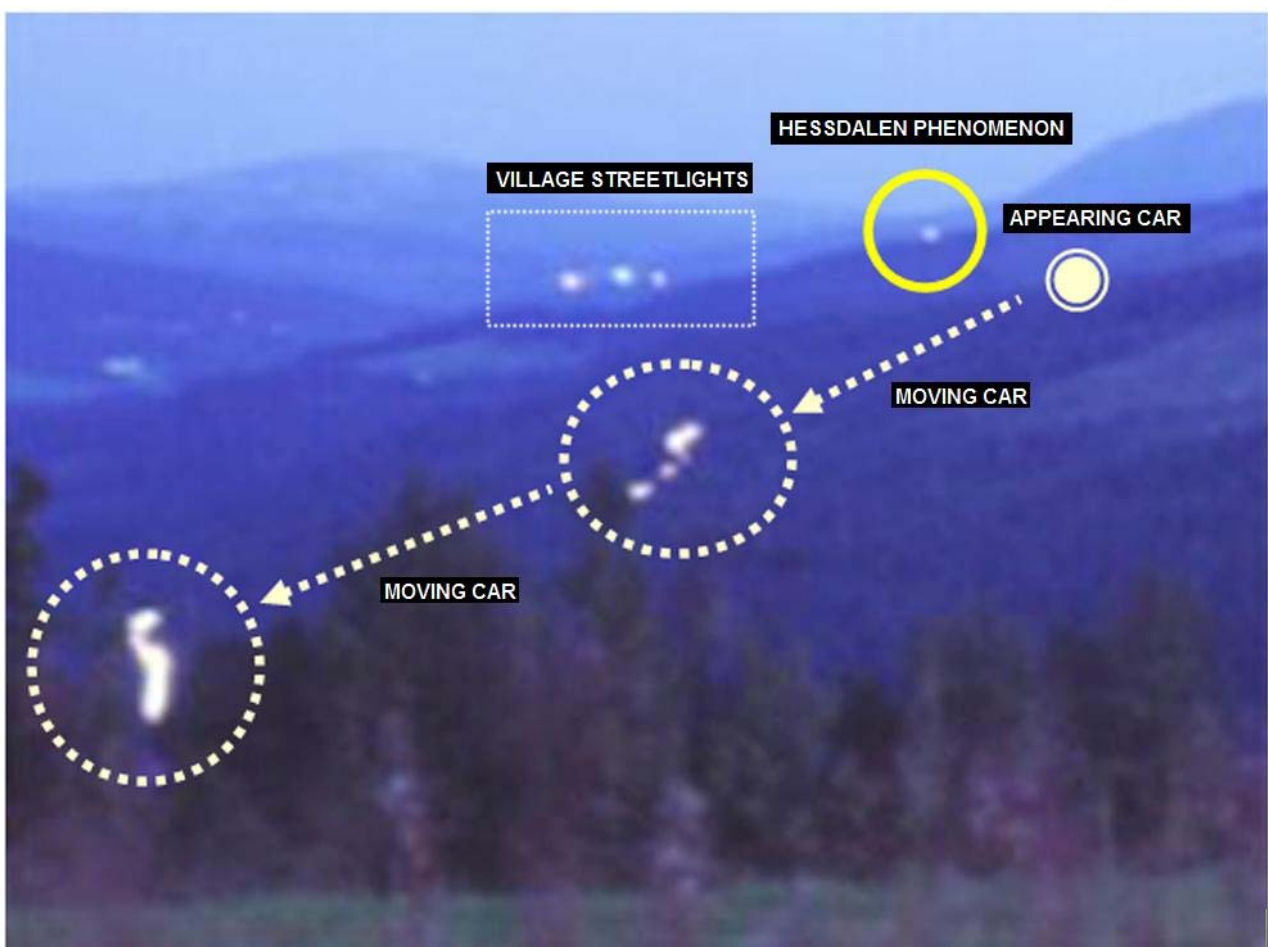


Figure 2. Photo (taken in August 2002) showing the dynamics of a moving car and at the same time the apparition of the light phenomenon much behind (but quite close angularly) the simulated point (white circle) in which the car was expected to appear.

Of course a person who didn't pass a sufficient time in the spot is not able to distinguish the two things and can be very easily confused, and Leone was not able as well, even if this was not his fault at all. But he earned his fault only later, as soon as he mixed up his misperception of the phenomenon with his arbitrary analytic constructions (which are partly good in themselves, but totally unrealistic). Leone didn't document *his own evidence* in other way than witnessing his own sight on the eyepiece of a toy-telescope, while all the rest is just technical arbitrary speculation.

For all of these reasons the physical assumption of the light phenomenon as an isotropic radiator is much stronger than Leone's alleged "visual evidence" of car headlights. Light beams from real car headlights were always visible by eye in Hessdalen by anyone and they were known to us, but there was no time to catch them in time photographically and, above all, from us there was no interest in doing this, except for registering once or twice the direction and the

photometric and spectroscopic characteristics of this source of noise and then fixing the point from which cars were coming.

Serious Criticism is Not Speculation on a Desk

Leone is invited to make a test directly on the field using his own instruments in order to prove or confute his arbitrary claims in the same way in which more serious skeptical researchers did in other areas of the world (Teodorani, 2008 – Part I), such as for instance the demonstration that some of the Min-Min lights in Australia are caused by vertical mirage (Pettigrew, 2003). Otherwise his own is only armchair toy-work with no connection with the observed reality of facts. So, he will have finally the possibility to make an analysis of his own true data and not using the work done by others. In my work, in addition to having taken true data, I have made reasonable assumptions. Leone's armchair work does not produce the same results, while all his technicism is just a hole in the water. Much better and more factual "skeptical results" (realistic, in this case) were produced even by high-school students when – in the case of the anomalous light phenomenon reoccurring in the St. Louis area (Canada) – they decided to make tests themselves directly on site to verify the "car hypothesis", in fact they diagnosed that a component of those recurrent light phenomena may be artefacts caused by light diffraction of car headlights through trees in distance with consequent light amplification (Lederhouse & Dunn, 2007). In the year 2000 a research group – composed of observers aboard an aircraft equipped with infrared and ultraviolet instrumentation and of observers on the ground – monitored (ATR, 2000) the Marfa area, Texas (USA), where since centuries strange light phenomena are often seen floating close to the Chinati Mountains. Only using instrumentation, by means of which the geological characteristics of the territory were studied – and not making armchair work – this group demonstrated that a part of light phenomena was caused by car headlights shining in the direction of the observation site reflected along the concave surface of soil, which is acting as a mirrored surface able to largely amplify the light intensity. While, already in 1978, a group of researchers was able to demonstrate, by carrying out laboratory experiments, that some alleged UFO phenomena sighted in the area of Uintah Basin, USA, might have been caused by a swarm of flying insects entirely illuminated by a St. Elmo's fire mechanism triggered by atmospheric electricity (Callahan & Mankin, 1978). All of these researchers reached their "skeptical conclusions" only after carrying out measurements directly on the field and/or reproducing an apparently anomalous phenomenology using appropriate lab experimentations: none of them dismantled and then reconstructed the data of others without acquiring any original comparative data and/or tests; they simply tucked-in their sleeves and took their own data. Science costs also some fatigue and engagement.

In experimental physics and astronomy – but also in the biological and naturalistic sciences – we operate in a way that is radically different than the ones of historians of physics (such as Leone), who – like everyone is – are necessarily affected by their own professional deformation. When we need to confirm or confute a given theory we: a) repeat ourselves measurements more times; b) if different experimenters, carry out confrontations with measurements taken by others by doing new measurements using the same instrumentations as the first ones. If these prerequisites are not respected – in particular, if some part of the data-acquisition process is not quantitative – there is no scientific method at all, but only unfounded semi-mathematical speculation, or arbitrary construction.

Spectra of Two Different Light Sources

Concerning spectra, the LED hypothesis which I proposed is but one hypothesis that must be ascertained with further measurements, but not an "ad hoc" assumption. Most importantly the three-peaked spectrum that Leone attributes only to a halogen lamp when photographed with a Kodak film whose sensitivity curve has three typical peaks, can be obtained as well – as I punctually did – assuming at least five different kinds of light sources that are other than halogen lamps, namely light sources that are not used at all by cars. Substantially these tests consist in multiplying the Kodak 100 ASA sensitivity curve by the intrinsic spectrum of the various light sources. I have carried out myself simulation tests in order to show this in a graph with precise comparative overplots (Teodorani, 2004a: see Fig. 2 therein), which collect together all the five light sources, including also incandescent light (car headlights) but not only that. On the contrary, Leone's analysis is deceptive and totally partial, because he considered only halogen light in his "data fitting procedure". My overplots contain spectra of all the light sources and not only the ones I like more. The LED hypothesis is only one of the proposed interpretations, not the definitive explanation, but it is surely the most reliable for the reasons that are explained in my previous papers (Teodorani, 2004a, 2004b). But it is a powerful hypothesis because the peaks of the LED spectrum match quite well the intensity levels of the corresponding light-cluster image (see *Figure 1, H2*) of the light phenomenon.

Concerning the spectrum itself as a source of physics information, saying that a LED spectrum is the "solution of the Hessdalen phenomenon" would be a true ingenuity. The light phenomenon at that specific time, during that specific weather conditions of high humidity, and in that specific location, has effectively proven to show that spectrum, but this doesn't mean that the light phenomenon must show always the same spectrum: claiming this would be only an

enormous scientific naivety. A spectrum of this kind of phenomena may change all the time its characteristics according to the atmospherical, lithosferical, mineralogical and even biological conditions, because – differently from stars ² – this kind of plasma phenomenon is mostly the result of ionization and/or excitation of the material that the field of force producing it encounters in its surroundings. For instance, if a light phenomenon occurs in an area of the territory that is rich in silicon or sodium – or whatever other chemical element – the spectrum might present spectral lines of those elements, occasionally added with atmospheric nitrogen and oxygen lines. And if the spectrum which I acquired in summer 2002 was showing a LED-like feature, this might have been due to the semiconducting characteristics of some mold spores that might have been occasionally present at that specific point in which a transiently plasma formed (Teodorani, 2004b), or to the presence on the surface of some piezoelectric minerals having semi-conductive characteristics (Demin, 1981). In general, spectra of this kind of light phenomena are subject to often drastic time-variability: in addition to me this spectral behaviour has been verified also by researchers taking spectra of the light phenomenon recurring on the Brown Mountain, USA (Warren, 2004).

Quite recently and presently I have been carrying out many tests and calibrations in Italy and abroad, in order to build up a spectral data bank of most known light sources, including car headlights (Teodorani, 2005), and identified the spectrum of an initially suspect “anomalous light” reoccurring in Australia, which is probably an artefact of some nature (Teodorani, 2004c).

Passing now to a more factual and pertinent argument, I evidently must stress that the observed (and not “arm-chaired”) spectrum of a car headlight is totally different from the spectrum which I took of the Hessdalen phenomenon (see **Figure 3**). This rules out once more Leone’s constructions and useless “best fits”.

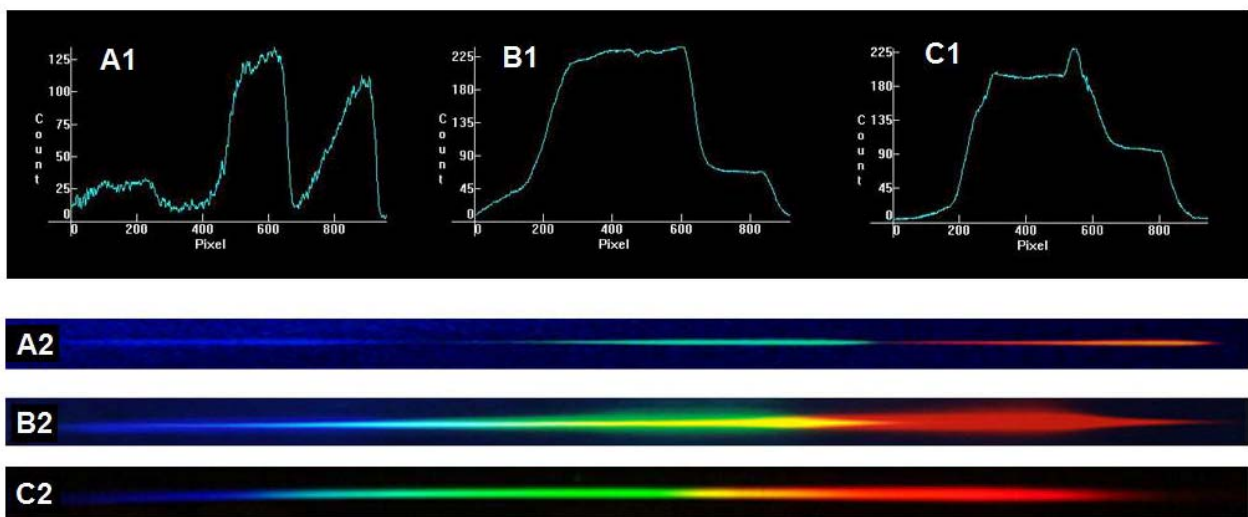


Figure 3. Spectra of: **a)** Anomalous light phenomenon taken in August 2002 in Hessdalen using a reflex camera and a 100 ASA film (A1: Plot, A2: Image); **b)** Car headlights taken in August 2002 in Hessdalen using a reflex camera and a 100 ASA film (B1: Plot, B2: Image); **c)** Car headlights taken in August 2005 in Italy using a high-resolution reflex digital camera (C1: Plot, C2: Image).

Everyone, I think and hope, in the scientific community, will reach a consensus on the fact that what is exactly the nature of a given spectrum must be verified and measured directly on the field, and not deduced by a desk-located technical toy-model. In this specific case, Leone didn’t take himself any spectra, not even test-experiments from the

² Who is using the terms “mini-star” or “mini-pulsar” (Tonset, 2007, and interviewed people) should first remember and cite the papers from which these ideas were born:

- Teodorani, M.; Montebugnoli, S. & Monari, J. (2000) “The EMBLA 2000 Mission in Hessdalen”. *Project Hessdalen – Articles and Reports* : <http://hessdalen.hiof.no/reports/EMBLA-2000.pdf> (PEER REVIEWED – Also published on *European Journal of UFO and Abduction Studies*, 2000, Vol. 2 (1), pp. 3-24.) (see pp. 14-17).
- Teodorani, M. & Nobili, G. (2002) “EMBLA 2002: Optical and Ground Survey in Hessdalen”. *Project Hessdalen Articles and Reports* : http://hessdalen.hiof.no/reports/EMBLA_2002_2.pdf (see Appendix: p. 24).

Using the term “mini-star” I did not mean that the spectrum of the light phenomenon must be necessarily steady like the one of a star, but only to show that a sort of a central force might be operating in order to contain the plasma. More recently, in Hessdalen a different and more realistic model of plasma containment and confinement has been invoked (Teodorani, 2004b).

yard of his home, but he preferred to speculate using only my own data. This is not at all a scientific procedure. And I am surprised on how many readers of this rational Journal have been invited by its commentary to take Leone's claims as a demonstration of "corroborating value".

Further Unfounded "Criticism"

Leone claims that "*It is fair to remember that Teodorani did not time the duration of the phenomenon*" (Leone, 2006a). This is not correct at all. I always timed the *duration* itself using a chronometer – and always recorded the exposure times of all photos – but not always the time of beginning and end of observation (which is not the same as "duration"), due to serious practical problems in writing notes during the night without a dedicated assistant (at the expenses of time lost, which on the contrary must be mainly employed to obtain the measurement data of interest, which request a high level of promptness). Who has not acquired this kind of experience directly on the field, can only venture "armchair criticism". Anyway, I am not an ufologist hunting marvellous events, but a physicist who is interested only in taking data of physical interest. In this specific case, phenomena duration (obtainable with a simple chronometer) is the datum of true interest for physics. In astrophysics when we study the physics of variable stars we are more interested in the duration of the pulsation period than when all this starts and finishes: this can be an additional "ephemeris" which can be important too (for astronomy) when the phenomenon is periodic and its maxima can be predicted in time, but the Hessdalen phenomena are another thing. Except for the occasions in which the phenomenon was videoed (the times are always automatically recorded in this case), when it was photographed conventionally (not using digital cameras at that specific time) which times should have been written down exactly? The starting exposure, the end of exposure, their average, the phenomenon apparition, the phenomenon disappearance or what? In such a case one should pass all the time signing the time of events which occur very many times (a scientist is not a public register officer), as the light-phenomenon – for who knows it – turns off and on many times: writing down these times is a formidable and useless time loss. This datum is of almost zero importance, because the Hessdalen phenomenon is *not* a transient "UFO" event, but only a very strange but quite recurrent geophysical phenomenon, which must be studied as such. All the data concerning phenomenon's duration and photo's exposure times were simply recorded orally using a portable tape recorder.

Synchronization of optical measurements with data taken using other instruments (such as VLF-ELF spectrometer and radar) was done indeed, but at the time of the optical phenomenon apparition these instruments gave no really meaningful readings. Some other times this synchronization was not possible at all because those other instruments were not in function at those specific times. People who want to speak of "synchronization necessity" should first participate at least more than once to this kind of instrumented expeditions on the field before pontificating from the height of their comfortable paper thrones. On the contrary a scientific skepticism (or "zeteticism") cannot be functional in any way.

Leone claims that "*Further quantitative data concerns the analysis of a ground sample and alleged infrared signature and recording in the HF and VLF ranges of dubious relevance to the optical phenomenology*" (Leone, 2006a). He doesn't explain how and why these observations are of dubious relevance, but most importantly, he doesn't understand how and why VLF ranges (as well as radar observations) – even if this is still undemonstrated – might reveal itself to be important in order to explain some IR observations, which in their turn might be nothing else than the optical phenomenon after a frequency shift to a range that is invisible to the eye (Strand, 1984; Teodorani, 2004b). As well as for optical data, I had and presently have a very complete database of known ionospheric and manmade signals, therefore I know what is anomalous and what is not (Teodorani & Nobili, 2004, 2007); but we did find some anomalous signals in the VLF range, which unfortunately didn't have a clear optical counterpart at that specific time. Unfortunately, whatever the reality of facts is, honest researchers are obliged to record what is really happening and not what they would like it happens. The CIPH group is supporting right now the acquisition of VLF-ELF data (CIPH, 2005): are they useless, according to Matteo Leone?

Ground sample analysis was supported by a strong motivation as well (Teodorani, 2004b), and the results – namely, the finding of small iron micro spheres – are strongly consistent with similar results that were obtained at the Kurchatov Institute, Russia, after creating artificial plasmas in the laboratory (Urutskoev, 2002).

Contrarily to that which Leone claims, eyewitness testimony, in spite of the good faith of many witnesses (especially in Hessdalen) is not a reliable element to extract objective information on phenomena such as UFO in general, and the subsequent statistics based on them can be inevitably affected by huge propagating errors due to psychological and neurophysiologic effects affecting witnesses and their capability to report real facts (Persinger, 2000). Making science with witnesses of UFO sightings is like to demand determinism from quantum mechanics. Some witnesses may be important to guide researchers to specific areas where the phenomena are recurrent, but cannot be used as instruments of observation. M. Leone quotes his investigation on witnesses in Hessdalen, claims that the evaluation of

witness can furnish scientific insights on the phenomenon, but doesn't inform where exactly his investigation on witnesses is technically published (2002 to present time).

M. Leone attributes to me definitive or "monolithic answers". If one reads more carefully my papers on the subject will notice that I have never given such answers but that I proposed hypotheses that have been changed or partly evolved or developed when in time more data were acquired. In science this means approaching a problem by subsequent approximations (Popper, 1992). In the Hessdalen area I have found different kinds of phenomena that manifest themselves in different wavelengths and the only reason why in some cases I related them together is just aimed at forming a working hypothesis and not an answer. Working hypotheses (Teodorani & Strand, 1998) – which can be proved or disproved in further phases – are a basic guide in the evolution of science, otherwise a researcher would be characterized by a serious thought deficiency and his/her research would be consequently stagnating. There is truly no innovation in science without throwing an arrow forward, while the plain use of instruments and the related data acquisition without properly thinking on the acquired data (except for using the ideas of others during journalists' interviews) is totally useless. Some of the phenomena in Hessdalen are not yet easily explainable as a natural geophysical mechanism, unless one makes intellectual acrobacy without any connection with the observed reality. Some other phenomena – probably the most part – can be explained with such mechanisms (Teodorani, 2004b, 2008 – Part II), especially those that occur at low height, which present very specific observational signatures and which occur where the geological and geophysical nature of the territory highly favours the onset of piezoelectricity and/or semiconductivity, subsequent plasma formation and finally interaction with water vapour and aerosol particles that seem to work quite well in confining a plasma ball in Hessdalen. This happens in many other places of the world, even if the physical mechanism able to confine a plasma ball may be – even drastically – different from case to case according to locations and atmospheric conditions (Teodorani, 2008 – Parts II and III). But there are not yet definitive answers. Therefore here the only "monolithic way" that I find is Leone's ludicrous way of "*questioning answers*".

Conclusive Remarks

Finally, I would like to stress once more for these readers that the most serious aspect that renders Leone's papers ungrounded from the beginning to the end, is the total lack of recorded data concerning all kinds of light phenomena (including car headlights, in particular): he collected no recorded data of his own and did no instrumented tests as well. He collected no photometric and spectroscopic data of his own that are supportable by documentary evidence and that can be consequently compared with my ones. He carried out no replication of the same measurements that I did in the area, not even lab tests done at his home using a camera and a grating (at the best of my knowledge). All of the data that Leone uses in his catatonic repetitions is my material. And all of his alleged "criticism" towards my work converges to proselytes in favour of the CIPH's wishful thinking of new money funds.

In conclusion, I think that the papers by M. Leone are very far from the explorative nature of innovative scientific research, of which *Zeitschrift für Anomalistik* should represent both the meaning and the goal. Leone's phrase: "*Do we really need at present to make advances on the Hessdalen lights research?*" (Leone, 2006a) should make more than one reader meditate and reason.

Whoever is interested to know much more on this "debate" can find many technical and historical details in a previous extensive paper of mine (Teodorani, 2004a) and in two shorter papers on the same subject (Teodorani, 2003, 2004d). In reality this one is neither a debate (as you all have probably understood) nor a "controversy". Controversies in science are born only when two or more *experimenters* find different results using the same equipment, not when only one obtains a given result experimentally and the other simulates and alters it virtually using the data of the original source – ignoring any propagation of possible systematic errors – sitting down on a desk, and occasionally throwing an eye into the eyepiece of a toy-telescope.

I personally try always to follow a protocol in which I offer my skepticism (Teodorani, 2004c, 2004e, 2008 – Part I) to science and not my science to skepticism, otherwise there would be no science but only a sort of "scientistic religion" (Shermer, 2002), which brings nowhere and nothing else than stagnation and a-critical dogmatization of the scientific knowledge that we acquired so far, but without any innovative evolution and/or flexible dynamics. Cowardliness in science can bring only to bright and ephemeral careers and in some cases to the pollution or destruction of the planet. Except for the Galilean method and related rigor (Popper, 1992; Teodorani, 2001; Teodorani & Strand, 1998, 2001) – which will not be withdrawn even in the construction of possible new paradigms and revolutions in science (Kuhn, 1996) – there seem to be some "anomalous" elements of nature according to which a part of the arguments and "paradigms" of our present science might be drastically dismantled (Nobili & Teodorani, 2007; Teodorani & Nobili, 2007), including the power structure that is behind them. Hessdalen-like (Strand, 1984) and other kinds of plasma phenomena, as well as some crucial aspects of quantum theory, are just some of those elements (Teodorani, 2006,

2008 – Part III; Tsyтович et al., 2007). And the time might be not so far in which an entirely new generation of “institutional and mainstream scientists” might replace a large part of the ones who have been operating so far inside the so-called “recognized scientific institutions” and the related political, economic and religious powers that harness and feed them. Some of us are presently and strongly moving in such a way that all this happens soon and in a capillary way.

I do hope that what has been so far the attempt of destructive criticism against my research and my person may become in the near future a constructive debate platform between researchers who are truly interested in the search for scientific truth and not in its deliberate obscuration. On the contrary we’ll have a world broken into two parts, but this is not advantageous at all at these precise moments of human history, where mankind needs unity and an open cross-confrontation towards a consensus aimed at a true progress and, above all, a solution of the energy problems of this planet and maybe the scientific – and not religious – *final solution* of what is our consciousness and its relation with our matter-energy realm, including life and cosmic intelligence.

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