

Summer BBQ

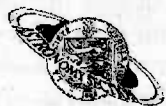
The date for the Perseid BBQ is Monday the 11th August 2003, with the usual meteor count afterwards. Last year we ended up using disposable BBQs and if those attending wish we can do the same again. They were easy to use and we had plenty to go round. If those who intend to come can let me know numbers we can decide on the best option. As in previous years we bring our own food plus a dish to share. After we have cleared up we then settle down and count what we hope will be a good show of meteors. The downside is that we shall have a full moon but we would not gain a great deal by moving that date earlier or later away from the meteor maximum.

National Astronomy Week

As noted inside, National Astronomy Week is being held from the 23rd to 30th August 2003 to coincide with Mars being at its closest to Earth for several thousand years. We are holding two Open Evenings, one on Tuesday 26th August and one on Friday 29th August. Weather permitting, we intend to stay open until about 2am on both evenings to view Mars at its brightest and best.

Open Evenings

As last year the Observatory will be open to the public every Tuesday evening during the school summer holidays. The Open Evenings sometimes attract quite a crowd and any member who can come along and help would be appreciated.



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Sagittarius

The Newsletter of the Astronomy
Section of La Société Guernesiae



July - Sept 2003

Forthcoming Events

BBQ and Perseid Meteor Count

Monday 11th August
8pm at the Observatory

Observatory Open Evenings

8th, 22nd, 29th July 9.30pm
5th, 12th, 19th August 9pm

26th & 29th August
9pm to 2am for Mars

2nd September 8.30pm
30th September 8pm

In addition, the Section meets
at the Observatory every
Tuesday evening, and Friday
if clear for observing.

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Centre inserts

Star chart
Sunset, sunrise, moonset
and moonrise times

Section News

by *Debby Quertier*

We have started our series of Open Evenings. The dates, which appeared in the last magazine, were picked to coincide with a youngish moon. May 6th turned out to be the best recent evening, with clear skies and a good number of people turning up. We set up each of the main telescopes to concentrate on one specific object. That day we had Jupiter in one and Saturn in the other. The various constellations and other objects of interest were pointed out with the aid of binoculars. Saturn has now gone for the summer and Jupiter is getting lower in the west and will soon be lost from view. Planet-wise the summer skies do not offer anything of naked eye visibility until Mars rises at a reasonable hour. (It is probably best to treat Uranus as needing optical aid). We do intend to view Pluto again, along with Uranus and Neptune. Mars will be at its closest and brightest as we get towards the end of August, though it will be best viewed after midnight when it starts to reach its highest point in the south. Both Neptune and Uranus are near to Mars, Uranus being the closer in Aquarius with Mars whilst Neptune is not far away in Capricorn. Pluto is in Ophiuchus and can be viewed a little earlier during the night. Although all four planets will be in the sky at the same time Pluto will be behind that tree that blocks our south west view by the time the larger three are high enough to view.

Generally when the weather is good our open evenings are pretty well attended and the donations are assisting greatly with the purchase of eyepieces and general needs of the observatory. We have had several enquiries from people interested in joining and hope to swell our numbers shortly.

The 7th May saw an event that, though not especially rare, was one that most of us had not seen before – a transit of Mercury. This is when the disc of Mercury is seen (though not by the naked eye) crossing the disc of the Sun. It takes several hours to happen and the tiny planet can be watched all the way using special filters or by projecting the image. A few of us met up at the observatory on a gloriously sunny morning and watched the whole thing using both the coelostat and the Celestron 11" telescope with a solar filter. The transit started as the Sun rose and the tiny planet finally left the Sun's disc at about 11.20 am, a little later than stated. The whole transit took over five hours. This event was visible throughout Europe, Africa and Asia. For a transit to occur Mercury must be very close to one of its nodes at the same time as it is at an inferior conjunction. At an inferior conjunction Mercury is directly in line with the Earth and Sun but, as its orbit is inclined to that of the Earth, it will appear above or below the Sun unless it is also close to one of its nodes, the point in its orbit when it is in the same

plane as the Earth's orbit. When the two things occur together the planet can be seen crossing the Sun, in a similar way to how the Sun, Moon and Earth line up for an eclipse, though sizes and distance make for very different effects. I had never seen a transit of Mercury before and had taken the day off work especially to see it and was not disappointed. The next one will be the 8th November 2006. The transit gave us a good opportunity to practise for the much rarer transit of Venus in June next year.

Telescope Donations

We have been donated two four and half inch reflecting telescopes. One was given by Mr Doug Cornwall and the second by the RSPB. We are very grateful for these generous donations and intend that they will be put to good use. Many people buy themselves a telescope, or are given one as a gift, but then find it difficult to use. Telescopes do take practice (and of course you are usually practising in the dark) and without it the result is that the telescope gets put away and never used. What we plan to do, and details will be in the next Sagittarius, is to hold a 'hands on' telescope night and aim it in particular at children. We will have the two donated telescopes, plus two others we

have, to give the children a chance to try out for themselves. We will select a night with a good moon and several 'easy' objects to find. Obviously the night is not just aimed at children but we feel that they would especially enjoy using a telescope.

National Astronomy Week

National Astronomy Week is being held from the 23rd to 30th August 2003 to coincide with Mars being at its closest to Earth for several thousand years. We have registered on the www.astronomyweek.org.uk website to advertise our Open Evening on the 26th August and an extra night on the 29th. Weather permitting, we intend to stay open until about 2am on both evenings to view Mars at its brightest and best. We think that those visitors who stay until 2am will be really keen and it may also be worth showing them the other planets that night. We have yet to plan the final details of each evening but intend to make the most of it and the expected visitors. There will be a display about Mars in the Observatory building, which is currently being made up. If anyone has any suggestions about anything special we could do to add for National Astronomy Week please let me know.

Debby Quertier

A Question of Relativity – Don't try this at home

A car 5 metres long is to be placed in a garage only 3 metres long. It is driven into the garage at four fifths of the speed of light by the owner; just before the bumpers strike the wall (which withstands the impact), show that the owner's wife can slam the doors. What is the length of the garage as seen by the driver and how does the car fit into the garage from his point of view?

(Answer page 7)

Globular Clusters

Some highlights from Frank Dowding's recent talk

A globular cluster is the most beautiful sight in the galaxy. Some can be seen with the naked eye or through binoculars, where they just appear as fuzzy patches. But through a large telescope a cluster can be resolved into many thousands, or possibly a million, stars grouped together to form a sphere. As first discovered by William Herschel around 1780 the stars are of different colour, according to their temperature. Even today the largest telescope cannot penetrate right through to the centre of a globular cluster, although the Hubble Space Telescope has seen remarkably close. Scientists have studied these pictures and believe there may be something rather big in the centre; a black hole has even been suggested.

Over a hundred globular clusters in our galaxy are known but, as many stars and gas clouds obscure our view, it is expected that nearer two hundred may exist. The galaxy is in the form of a sphere of stars, known as the halo, like a transparent ball which encloses the many stars within the disc, with its central nuclear bulge. Globular clusters are spread pretty randomly throughout the halo, but are more concentrated towards the centre bulge, where 30% of all clusters exist. There are also a number of globular clusters outside of the halo, known as satellite globules.

Harlow Shapley in 1917 was able to determine the centre of the galaxy by noting the positions of these central clusters. He determined the centre to be through the constellation of Sagittarius. A convenient measure in galactic terms is the parsec, which is 3.26 light years, or approximately 19 million million miles. (Put in that context, the nearest star to our Sun is a little under one and a half parsecs away). The halo is about 20 thousand parsecs in radius. But the satellite globules, outside of the halo, are all in excess of 37 thousand parsecs from the galactic centre, with no globules at all between 20 and 37 thousand parsecs. It is generally thought that, knowing the mass of the galaxy and the speed at which it rotates, that the globular clusters at 37 thousand parsecs are outside of the galaxy, and that the gap where none exist is because any globules that were there have since been gravitationally drawn inwards, so leaving a void.

A good example of a globular cluster is M13 in the constellation of Hercules. It is the most prominent in the northern hemisphere and contains around a hundred thousand stars. It is around 30 parsecs in diameter.

In our part of the galaxy if we could place a cubic parsec frame around our Sun then it would be the only star within that frame. The nearest star

would be well outside. If we placed the same cubic parsec around a star inside a globular cluster there could be around ten thousand other stars within the frame, though there would still be thousands of millions of miles between each star.

The clusters rotate around the galaxy, with the galaxy centre as the focus of an ellipse. Those near the centre travel faster than the halo globules, which in turn are faster than the satellites. Speeds of many hundreds of miles per second have been recorded. Most of the stars are double stars. When one reaches the end of its life matter can be transferred resulting in a white dwarf or a neutron star to give an X-ray binary system. Pulsars too are known to exist and could also account for X-ray emissions from clusters.

Use of the H-R diagram has indicated that globular clusters contain the oldest stars in the galaxy. In fact their estimated ages of 10 to 17 thousand million years has provoked many controversies, since they appear to be older than the age of the Universe estimated by other methods.

There are a number of unanswered questions. Why, for example, do the clusters near the centre have a larger amount of elements heavier than hydrogen and helium if they were created at a time when only hydrogen and helium existed? The larger stars can create their own, but the smaller stars also have them. And why do

globular clusters exist anyway, rather than individual stars? There is as yet no answer to these questions, but theories are being put forward. One theory is that as the original galactic cloud was just starting to condense the middle condensed first into huge, massive stars, called population 3 stars, with very short life spans. These were able to very quickly produce heavy elements. They then exploded into the centre of the cloud from which the centre or disc globules were created. Alternatively, perhaps the galactic cloud did not collapse at all but instead condensed into pockets of clouds from which all the clusters were created. It is thought by some that all stars were created in globular clusters in the halo and over the years due to collisions most have fallen apart, producing the situation we have today.

Globular clusters are found in all galaxies. The giant elliptical galaxy M87 has many thousands, other galaxies have only a few.

In recent years globular clusters have become a focus of interest for scientists and astronomers. Not only are they beautiful to look at but they may just hold the key to what happened during the early years of not only our galaxy but all galaxies throughout the Universe.

Frank Dowding

Astronomy and Space - References for Further Reading by Geoff Falla

Dark Energy on the Increase? In 1998 astronomers discovered that mysterious 'dark energy' was accelerating the expansion of the Universe. It now seems that the future will be even more dominated by dark energy. *Astronomy, March 2003*

The Martian Polar Caps. The history of the Martian climate may be revealed by a study of the polar cap regions. There is already evidence that Mars is in the process of a climate reversal. *Astronomy, March 2003*

The Keck Observatory - Hawaii. The largest and finest telescopes on Earth are on the summit of Mauna Kea, Hawaii. A review of the observatory's work, with examples of some of the remarkable images obtained. *Astronomy, April 2003*

The Microwave Background. A set of articles containing evidence of how the Universe began. On February 11th NASA revealed the first results from a space probe designed to improve the measurement of background microwave radiation, left over from the Big Bang. The WMAP results provide a much more detailed map of the background radiation than that obtained previously with the COBE

satellite in 1992. *Astronomy Now, April 2003*

Planets in Production. It is now thought that most newly-formed stars are surrounded by discs of material in the process of planet formation. This was first observed in the Orion Nebula in 1994, and has continued with the study of stars in other constellations. *Sky and Telescope, April 2003*

The Centre of the Galaxy. The Milky Way's centre is in the constellation of Sagittarius, much obscured by the concentration of interstellar dust. The use of infrared and X-ray techniques has allowed astronomers to uncover many secrets of the galaxy's core. *Sky and Telescope, April 2003*

Ultra High-Resolution Astronomy. The use of two or more telescopes working in combination to focus an image is producing sharper images than ever before. The most recent development of the interferometry process was launched in 2001 with the twin Keck telescopes in Hawaii, and at the European Southern observatory in Chile. *Sky and Telescope, May 2003*

Supernovae of the Milky Way. A historical review of supernovae in our own galaxy. The earliest and brightest of these was observed in the year 1006, much brighter than the 1054 event which produced the Crab Nebula. *Sky and Telescope, May 2003*

Planetary Transits. Transits across the Sun by the planets Mercury and Venus are of particular interest at the present time. Apart from the transit of Mercury on May 7th this year, there will be a more rare transit of Venus in June 2004. Details of the different cycles involved in these planetary transits. *Astronomy Now, May 2003*

Cosmic Rays. The discovery of cosmic rays, and the work of the Scottish scientist Charles Wilson, who developed the device known as a cloud chamber to study the paths of ionising particles. *Astronomy Now, May 2003*

Planetary Moons. Well over a hundred moons are now known to be in orbit around our solar system's planets. Some information on how they were formed, and some of the differences observed. *Astronomy Now, May 2003*

Double Star Photographs. Some of the best coloured double stars, and including perhaps the best ever photograph of the favourite double star Albireo, in the constellation

Cygnus. *Sky and Telescope, May 2003*

Mars Mission. Towards the end of August Mars will be closer to Earth than at any other time in recorded history. A set of articles describing past missions, the current European Space Agency's Mars Express with its British spaceprobe Beagle 2, due to land on Mars at the end of December, and plans for the future. *Astronomy Now, June 2003*

Jodrell Bank Radiotelescope. The history of the radiotelescope at Jodrell Bank, now named the Lovell Telescope, which came into use in 1957. The telescope, which succeeded in tracking the first satellite launched into orbit - Sputnik 1 in October 1957, has recently been renovated and upgraded. *Astronomy Now, June 2003*

Extra Dimensions? New observatory experiments may soon confirm whether other dimensions really do exist. The enigmatic 'dark matter' could be the gravity of such shadow worlds. *Sky and Telescope, June 2003*

Answer to A Question of Relativity

There are two events; (i) the striking of the front bumpers of the car with the garage wall, and (ii) the slamming of the garage door at the back of the car. From the wife's point of view these two events are simultaneous and the car is contracted due to relativistic effects (the Fitzgerald contraction). Since the car is travelling at $4/5$ of the speed of light it is, from her perspective, contracted by a factor of $\sqrt{1 - 4/5^2} = 3/5$. Hence the car which is 5 metres long at rest is contracted to 3 metres in length and just fits into the garage. From the driver's point of view it is the garage which is contracted in length. It is only $3 \times 3/5 = 1.8$ metres long! However, for him the striking of the front bumpers with the garage wall and the closing of the garage door are not simultaneous events. The front bumpers strike first and the car crumples up to fit in the garage before his wife closes the door.

(Question taken from "An Introduction to Tensor Calculus, Relativity and Cosmology" 3rd Edition by DF Lawden).
Peter Langford

Extraterrestrial Intelligence?

In his recent talk to the Section Geoff Falla explored the case for linking UFOs with extraterrestrial intelligence

The search for extraterrestrial radio signals - the SETI project, has not yet announced any definite results. At the beginning of 2003 about 150 promising signals had been identified, and these were to be checked more thoroughly. Plans were also in hand to widen and improve the search, with a new observatory at Harvard University, Massachusetts, also starting a search for laser signals.

When Dr Frank Drake of Cornell University started the original project, in 1959, the estimate arrived at in discussion with scientific colleagues was that the existence of extraterrestrial civilizations was

almost certain. Scientific opinion was also expressed that, given the rate at which technology can be developed, any such civilizations could have already explored through the Milky Way galaxy, including our own solar system. Dr Carl Sagan, a member of the original discussion panel, agreed with this virtual certainty of other life in the Universe. He confirmed that there seemed to be no physical reason why interstellar exploration could not have been achieved.

is there evidence that the existence of extraterrestrial intelligence may perhaps be not that far away? Could Earth have already been visited in the past, or in present times?

Given this level of probability, is there evidence that the existence of extraterrestrial intelligence may perhaps be not that far away? Could Earth have already been visited in the past, or in present times? Although there are historical records involving sightings of unexplained objects, or strange phenomena, it is not certain how well these were investigated, or what natural explanations could have been considered at the time.

Professor Peter Sturrock, who was Director of the Centre for Space Science and Astrophysics at Stanford University, California,

conducted a survey of more than a thousand members of the American Astronomical Society in 1976. The survey asked whether the astronomers had experienced any unusual observations which they had been unable to explain. The response was that some of the astronomers, amounting to a few per cent, had in fact observed objects which they were completely unable to explain, in the category of unidentified flying objects. A more substantial number of the astronomers thought that the

subject of UFOs deserved more serious scientific study.

In 1982, Professor Sturrock established the Society for Scientific Exploration, for the unbiased investigation of these and other anomalous experiences, and in 1997 he went further by setting up a panel of scientists to study a selection of UFO reports which included some kind of physical evidence. The study included photographs, radar-visual cases, interference effects involving vehicles and aircraft, and physical traces.

The conclusions of this study were that there was unlikely to be a simple answer to UFO reports, that scientists could learn something new from the study of these unexplained observations, and that studies should concentrate on reports which include as much independent physical evidence as possible.

Photographic evidence of what may be unexplained objects is not always reliable, for several reasons, unless supported by visual observation. There are, however, a number of photographs which appear to

confirm the reality of unknown objects.

More reliable cases include radar-visual incidents, sometimes confirming the observation of objects travelling at high speeds, and with sharp turns, considered to be well beyond the capabilities of any aircraft. It has been found that many of these radar-visual reports cannot be explained in any conventional way.

Interference effects involving vehicles, and aircraft, are another type of unexplained event. Of all the

Of all the physical effects claimed to be associated with UFO reports, these interference effects are perhaps the most puzzling. In several hundred cases of this type, vehicle engines and lights lose power, or fail completely, while an unknown object is seen nearby, and do not return to normal until the unknown object has moved away again.

physical effects claimed to be associated with UFO reports, these interference effects are perhaps the most puzzling. In several hundred cases of this type, vehicle engines and lights lose power, or fail completely, while an unknown object is seen nearby, and do not return to normal until the unknown object has moved away again.

Aircraft crews have also reported magnetic and other effects in similar incidents.

There may not be much awareness of this evidence, unless the subject has been studied in some detail. When opinion polls have been

carried out, the general opinion seems to be that UFOs do exist. This opinion seems to have strengthened with recently reported cases, but the interpretation of the reports, and whether they really are evidence of extraterrestrial intelligence, has been more debatable. As long ago as 1948, however, soon after the first wave of reports came to public attention, a secret 'estimate of the situation', prepared by the U.S. Air Force Technical Intelligence Centre, concluded that UFOs were interplanetary. The report was not accepted, on the orders of the Chief of Staff.

The French Minister of Defence, when interviewed on the subject in 1974, emphasized that it was necessary to adopt an extremely open attitude of mind, and that the subject of UFOs was not at all understood. There were no definite conclusions, but he admitted that he had taken a particular interest in apparent correlations between UFO reports and magnetic field changes. A network of research stations in France had already established that major disturbances of the magnetic field coincided with UFO reports in the same locality.

Reports of UFO incidents in France are investigated first by the local

Gendarmerie, before being passed on to a Department of the French National Space Centre in Toulouse for more detailed study. The Centre had come to several conclusions. It had been established that magnetic compasses were affected in about two per cent of the cases, and that vehicle engine failures occurred where there was electric ignition. It was thought that the apparent brightness of the reported objects could perhaps be produced by ionization of the atmosphere. Objects seen on the ground were also noted in a proportion of cases. The same pattern of events was apparent in other countries, and it seemed evident that there was some intelligence behind the phenomena.

Some of the explanations may seem at first to be plausible, but in many cases they do not take into account most of the evidence, and are then found to be just not possible when further investigated.

In 1999, a study carried out in France by the Institute of Higher Studies for National Defence (COMETA) reached the conclusion that the physical reality of UFOs under intelligent control was almost certain, and that the only hypothesis which took into account all of the available data was that they were of extraterrestrial origin.

Many contrary explanations for the various unexplained reports have been put forward by government officials, astronomers, and scientists. Some of the explanations may seem at first to be plausible, but in many cases they do not take into account

most of the evidence, and are then found to be just not possible when further investigated. These explanations, however, do perhaps have the desired effect of reducing public interest until the whole matter is quietly forgotten.

Are there other unexplained phenomena which may also be considered as possible evidence of extraterrestrial intelligence? There are many reports of physical traces in the form of ground markings, and vegetation effects relating to UFO incidents, but even more controversial are the mysterious crop circles. Given the possible reality of UFOs as being of extraterrestrial origin, it has been thought that the circles may be evidence of landing sites. That was in the earliest, and more simple form of the crop circles, but other explanations have become more obvious.

The crop circles have been appearing mostly in the South of England, but also in other countries. The circles, which began to appear around 1980 in precise forms, have become more frequent, with complex patterns.

At first, it was thought that the crop circles were the result of whirlwinds.

Efforts were made to pursue this theory, even as more complex shapes began to appear. It seemed clear, however, that there were several reasons why whirlwinds could not be responsible for these shapes. Not least of these reasons was that the formations always had very clear cut edges. A whirlwind would not always remain completely stationary while the shape was being formed. The crop was flat on the ground, not lifted, and the circles appeared overnight. It was also difficult to understand how any kind

of natural phenomenon could be a recent development.

It became more obvious that many of the circles, and particularly the more complex patterns, must be hoax formations. But even here, there were claimed to be unexplained features. The formations were

often found in inaccessible areas, sometimes only discovered from the air. It has also been found that the crop is often undamaged, and with the stalks bent flat at right angles to the ground, but without being broken. Some of the shapes are slightly oval on sloping ground, depending on the angle of slope. More surprisingly, there is also claimed to be evidence of heating effects, and of magnetic effects

When the locations of the vehicle interference effect incidents were checked in the British cases, some concentration of these reports was noted in one particular area - the adjoining counties of Wiltshire and Hampshire. These are the same counties where the great majority of the crop circles and patterns have also been appearing.

when compared with the surrounding area.

When the locations of the vehicle interference effect incidents were checked in the British cases, some concentration of these reports was noted in one particular area - the adjoining counties of Wiltshire and Hampshire. These are the same counties where the great majority of the crop circles and patterns have also been appearing.

There have always been occasional reports of unexplained luminous objects in areas where crop circle patterns have appeared, but another apparent link with UFO reports has been found, in association with the study of the reported interference effect cases. This could perhaps be dismissed as just a coincidence, but it goes further than that. The more precise locations of many of these events are also the same in both cases. It is beginning to look as if there is a definite link, but the reasons for such a link may not become apparent until the incidents are studied in more detail.

It seems that the crop circle formations have been a developing phenomenon, however they are formed. One of the most complex patterns, the 'Arecibo Message', appeared near Winchester in July 2001. This was similar to the message transmitted in November

1974 to the Hercules star cluster M13, from the radio telescope in Puerto Rico.

Whether these crop circles patterns are largely produced by hoaxing, conceivably by some kind of experiment from the air, or by something else, it will be interesting to see if this development continues, or if it will diminish if the novelty of design begins to fade.

There are occasional reports which suggest that there is more to these unexplained phenomena than we may realize. It has been revealed that governments around the world have

Astronauts have sometimes reported unexplained objects in space, with many firmly believing in the existence of other intelligences.

kept much of the information secret, but exchange information in some cases. As long ago as 1959, when the NASA organization was first formed, and was considering its plans for space research, it received advice from Washington's long established Brookings Institution. Part of that advice was that if evidence of extraterrestrial intelligence was discovered, NASA should give serious consideration to not saying anything about it. Perhaps this is the reason for some of the secrecy.

Astronauts have sometimes reported unexplained objects in space, with many firmly believing in the existence of other intelligences. When we also read that the

Ukrainian National Academy of Sciences has actually been conducting a search for alien artefacts on the Moon's surface, it really gives us cause to wonder whether there may indeed be much more to all of this than may at first seem evident.

Sightings of Unknown Objects and reported effects.

(The following selection of reports are mostly shortened summaries, which do not include all of the original details.)

August 18, 1783. From the terrace of Windsor Castle, four witnesses - including a founder of the Royal Academy, observed a strange oblong shaped cloud. Below this, a brilliantly lit object became stationary before moving again eastwards, and changing direction. The sighting was recorded in the Philosophical Transactions of the Royal Society.

January 12, 1836. At 6 a.m. in St Martins, Guernsey, a very bright object was seen, stationary for a while before it moved away westwards at speed. On the same day in Cherbourg, Normandy, a luminous object was seen which had a dark cavity at the centre, and seemed to spin on its axis. The sighting in France was recorded in the Report of the British Association for the Advancement of Science, 1860.

December 6, 1952. Over the Gulf of Mexico the crew of a B 29 aircraft observed on radar, and later visually, several formations of disc-shaped objects passing the aircraft at speeds of between 5,000 and 9,000 m.p.h. Some of the objects, which were blue in colour, manoeuvred to avoid the aircraft. On the radarscope the objects were seen to converge towards a large spot, where they disappeared.

November, 1957. In Texas and New Mexico, there was a series of more than a dozen incidents over a four day period, involving sightings of unknown luminous objects, and the reported failure of vehicle engines and lights while the objects were nearby. A U.S. Air Force investigator explained the incidents as the result of a severe electrical storm, causing exaggeration of what was seen, but some years later atmospheric physicist Dr James McDonald established that there were no storms at the times of the sightings.

November 6, 1967. Between Avon and Sopley in Hampshire, a large luminous object was seen to pass slowly between a car and a lorry. The car lights and engine failed, and the lights of the diesel engined lorry. The engine and lights would not operate again until the object began to move farther away, accelerating and disappearing in seconds.

March 10, 1969. At about 10.30 a.m. near Lancaster, Missouri, a

motorist saw a light beam on the road, and looked up to see a grey disc-shaped object with a dome, which was emitting the light beam from underneath. As the beam touched the car, its speed dropped from 50 m.p.h. to 8 m.p.h. When it had passed through the beam, the car functioned normally again. On the evening of the same day, a police chief driving near Westhope, North Dakota, observed a similar object, also emitting a light beam. The object hovered nearby for about ten minutes before it moved away at speed. He also reported that his hand radio had been affected by heavy static interference while the object was nearby.

September 17, 1976. At Wingen, Australia, a motor mechanic driving on the New England Highway found his car engine and lights failing suddenly. He could not find any faults, but his torch would not turn on, and its magnetic clamp would not hold on to the car body. A large blue ball of light was then seen, passing low overhead before it disappeared over a mountain range. After a while the car engine could be restarted.

September 18, 1976. In Iran, an unidentified object was seen from the control tower of Mehrabad Airport, Teheran. Two military aircraft were sent to investigate, but the object then increased speed, and turned to follow the jets for a short time. The pilots tried to open fire on the object, but firing devices and

communications failed within a five kilometre range.

December 28, 1980. Personnel from Woodbridge Air Base, Suffolk, went to investigate lights seen moving through the trees nearby in Rendlesham Forest, and reported seeing a triangular metallic-looking object on the ground before it left the area. Later investigation found depressions at the site and radiation traces. A memorandum was sent to the Ministry of Defence, but the incident was not revealed until more than two years later, under the provisions of the Freedom of Information Act in the U.S.A.

January 8, 1981. At Trans-en-Provence, in the South of France, the reported brief landing of an unknown object was investigated. The object, shaped like two saucers face to face, had made a slight whistling sound. Scientific analysis under the direction of a department of the French National Space Centre at Toulouse found strange effects on plants at the site, evidence of heating, and of a powerful electromagnetic field in the microwave frequency range.

June 8, 1991. Air traffic control at Asuncion Airport, Paraguay, reported an unidentified radar track, and observed an object hovering over a runway. Two aircraft also reported observing an unknown object, with one pilot noting apparent effects on the aircraft's automatic direction finding equipment while the object was

nearby. He reported that the object approached and moved away from the aircraft several times, and that it seemed to be under intelligent control.

November 28, 2002. In Buenos Aires, Argentina, two policemen in a patrol car saw a large light manoeuvring in the sky before it approached the car. As the light then reversed its course, the car engine and lights failed. About half an hour later, when the object had disappeared, the police car siren suddenly came on, and the engine restarted. A total of five police officers were involved in the incident.

Geoff Falla

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