

Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise

July – September 2007

Forthcoming Events

Perseids BBQ:
Observatory: 12th August:
7.30 pm

Public Open Evenings
2007

24th July: 9.30 pm

31st July: 9.30 pm

7th August: 9.00 pm

14th August: 9.00 pm

21st August: 9.00 pm

28th August: 9.00 pm

18th September: 8.00 pm

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

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Star chart

Sunset, sunrise, moonset and moonrise times

A Messenger to Mercury

There are many uncertainties in the theory of planet formation. Every visit to another world made by NASA, and in more recent times, the European Space Agency uncovers additional answers and sometimes without fully understanding the questions.

It has long been known that Mercury, being the closest planet to the Sun, holds more clues to the way planetary formation took place than anywhere else. It was in 1974 that Mariner 10 flew past Mercury and discovered many interesting facts. Mercury is a planet of extremes. It is the densest of all. Mercury's metal rich core, of probably iron and nickel, accounts for 65% of the mass of the planet. Relatively, this is twice the size of the Earth's core. Mercury has a global magnetic field like the Earth. Whereas the Earth's field is believed to emanate from the hot liquid part of the core, Mercury being less than half the size of the Earth, should have lost its heat millions of years ago. Mercury's rotational axis is virtually perpendicular to the Sun, so that sunlight never enters certain craters at the polar regions. Observations from Mariner 10 saw what some scientists believed to be ice in these craters. Ice so close to the sun? Mercury was always deemed too small to retain an atmosphere, but Mariner 10 found small traces of helium, oxygen, argon, sodium and potassium. The surface showed a range of different types of rock, which was due to enormous volcanism or many impacts, or both. Mariner 10 had been hugely

successful, even though it was a mere fly-by of the planet and not a dedicated mission. How intriguing it would be if a probe could orbit Mercury for a year or so and study all these items at first hand. To study the effect the sun has on the planet in close proximity, would help understand the effect the sun has on the Earth.

On August 3rd 2004, a Delta II three stage heavy rocket left Cape Canaveral, carrying "Messenger", the probe designed to orbit Mercury. The name Messenger is a reference to Mercury's Roman mythological association, Mercury being the winged messenger of the gods. An hour after launch, Mission Control announced success and the third and uppermost section of the Delta II rocket had released Messenger, which was now out of Earth orbit and heading towards Mercury at around 30,000 mph.

NASA space scientists have become very skilled at designing trajectories for space vehicles to follow between planets. There are many complexities involved, but there are two basic problems; firstly to achieve the exact speed and direction to leave the Earth and secondly to arrive at the other planet at an exact speed to permit a stable orbit. Space vehicles when travelling between planets, do so in a circular route, as though they were a planet themselves orbiting around the Sun. If the space vehicle goes faster than the Sun's attractive gravitational force at any point, then it will spiral

outward towards the outer planets. Conversely if the space vehicle travels slower than the Sun's attraction then it will spiral inwards towards the inner planets. So on this journey from Earth to Mercury, Messenger will be orbiting ever closer towards the sun. During this time, the sun will be pulling Messenger faster and faster. In actual fact, when Messenger leaves the Earth, its speed in relation to the sun is the orbital speed of the earth at around 67,000 mph plus its own speed relative to the Earth of 30,000 mph totaling around 97,000 mph. Now this would not be too bad on reaching Mercury, since Mercury's orbital speed is about 89,000 mph, and Messenger would have to quicken up to achieve a stable orbit. However, the effect of the Sun's gravity on Messenger is huge, the strongest pull will be between Venus and Mercury, where the vehicle will reach speeds much too fast for a successful orbit of Mercury. It is quite possible to leave Earth and fly to Mercury in three and a half months but to keep correcting the course and slow down sufficiently would need a huge rocket with a lot of fuel which was financially unviable.

This was the problem posed, how to slow Messenger down enough so as not to overshoot Mercury and crash into the Sun and use as little fuel as possible. It was Chen-wan Yen, of the Jet Propulsion Laboratory in Pasadena, who was mainly responsible for solving the problem. Back in the mid eighties, he devised a way of using planetary gravity to slow the vehicle down. Up to this point, planets had been used only to increase the

speed of a space vehicle. Chen-wen Yen, said that while the vehicle is approaching a planet, energy in the form of gravity is assisting by increasing the vehicle's speed whilst on the opposite side of the planet, the reverse is happening, as the planet's gravitational pull is actually trying to pull it back, so slowing it down.

The calculation required was exacting and the trajectory devised a long one taking six and a half years with an insertion into Mercury orbit planned for 18th March 2011. It will involve fifteen orbits of the Sun. The first orbit brought it back to the Earth in August 2005, where the Earth slowed it for the first time and bent its course towards Venus. While passing Earth, Messenger took some stunning images. On its way to Venus, it did what is called a deep space manoeuvre, which meant looping the loop, turning in a big circle and so slowing it further. It is to do five similar manoeuvres before reaching Mercury.

Venus slowed it down in October 2006 and again on its next orbit of 6th June 2007. The space craft was slowed further by passing through the high atmosphere of Venus to create increased drag at only 186 miles from the surface. Messenger used the Venus fly-by to try some of the instruments that it will use on Mercury. A laser altimeter was used to map a small portion of Venus's surface. The surface of Venus is also being mapped by the European Venus Express mission.

The next slowing down, or gravity assist, will be by Mercury itself but it will be between Venus and Mercury that Messenger will experience the greatest increase in speed to around 140,000 mph despite the early speed corrections by Earth and Venus. In order to avoid an overshoot, Messenger will encounter Mercury for a first slow down on 15th January 2008 and do another orbit of the Sun, a further deep space manoeuvre, then line up for another slow down at Mercury on 6th October 2008 followed by another orbit, another deep space manoeuvre, and then a third encounter and slow down with Mercury. One more orbit of the Sun and one more deep space manoeuvre is expected to reduce the spacecraft's speed to be in

line with Mercury's orbital speed of around 89,000 mph, so that it can gently come up alongside Mercury and use the main engine to effect an orbit tilted at 80% to the equator. If all goes well, Messenger should be in orbit for a year, until March 2012 but this will depend on how much of its fuel was consumed on the journey.

Whilst Messenger is a good name for a mission to Mercury on classical grounds it is also an acronym:

Mercury, Surface, Space,
Environment, Geochemistry
Ranging.

Frank Dowding

Strange Objects in the Sky

Astronomy is about observing mostly predictable objects in the sky, these include planets, stars and far-distant galaxies. We do not usually expect to see anything which is outside our previous experience. There are occasionally the more unusual events to be seen, such as eclipses, planetary transits across the Sun and occultations of planets behind the Moon. Other observations can be quite unpredictable at times, perhaps a very bright meteor - sometimes a 'sporadic' which is not part of any recognized meteor shower visible around the same dates each year. There are also comets which can come as a surprise, arriving at any time from the outer parts of the solar system.

Very occasionally there are other

much more unusual phenomena or events reported, which are mostly assumed to have some natural cause, even if they cannot always be fully explained at the time. An example of this kind of event was the slow moving Moon-like object seen locally in 1843, and described in one account as a 'meteor', but which was evidently no such thing - since no meteor can really be visible for ten to fifteen minutes, as reported on that remarkable occasion. As recently suggested, the object may have been a rare atmospheric phenomenon. Or perhaps it was linked with the seismic activity around that time, since strong earth tremors were felt in the island about two days later. Earthquake lights - glowing effects and objects in the sky have become in more recent

years a known phenomenon.

The recent sighting of two large bright yellow objects in the sky, and apparently stationary between Alderney and Guernsey, was reported by an Aurigny Air Services Trislander pilot. This was also seen by passengers on the aircraft which was to the north of Alderney during a flight from Southampton. The sighting was confirmed at the same time by another pilot of a passenger aircraft flying near Sark while on the way to Jersey, and seeing this from the opposite direction - looking north.

We can return to this later, with explanations put forward and some conclusions, but this also seems to be a good opportunity to look at several other very interesting reports of strange objects in the sky, recorded over the years locally and from the nearby French coast. One of these predates the Guernsey event of 1843, is more of a challenge to explain in any conventional way, and was included in an official report of the British Association for the Advancement of Science.

On January 12th, 1836, it was reported that a large bright object appeared in the sky over St Martin's parish at 6 am. The object was described as being about as large as the Sun - it would still have been dark at that time, with sunrise about two hours later. The object was also described as being so bright that a pin could have been picked up from the ground. After being stationary for a few minutes, the object moved away westwards at great

speed with rays darting out all around it.

Even more remarkable was that on this same day at Cherbourg - about 40 miles away on the Normandy coast, an unknown object in the sky was also reported. A luminous object was seen which appeared to be about two thirds the size of the Moon. The object was described as having a dark cavity at the centre, and it seemed to spin on an axis. This French account was included in a Report of the British Association for the Advancement of Science some years later, in 1860.

Other unexplained sightings from the Cherbourg area began on March 30th, 1905, when as reported in the newspaper 'Cherbourg Eclair', a luminous globe in the sky was seen to come from a northerly direction before making a large curve over the city, and disappearing at about 11 pm in the direction from which it came. On a number of following evenings in the next two weeks, there were further reports of a reddish light seen in the sky. The light was described as having a less definite margin or corona around it, about five times the diameter of the object itself. The sightings were thought to be perhaps caused by the planet Venus, which was at its brightest around this time, but the commander of a naval vessel sent out to investigate the sightings reported that the object was not in the position of Venus, and did not have its crescent shape.

In more recent years, in Alderney on 16th November, 1967, a local resident reported seeing a very unusual object

in the sky to the southeast of Essex Castle at 5.10 pm. The object was thought at first to be something like a parachute flare, but when it was looked at through binoculars the object was seen to be in the form of a cross, with the horizontal and vertical parts of the shape being of different colours. The lower arm of the cross shape seemed to be unsteady, described as 'wobbling as though producing a motive force'. After being stationary in the sky for six or seven minutes, the object moved swiftly towards the southwest and disappeared in two or three minutes. It was later confirmed that it was just dark at the time, but too cloudy for any stars to be visible. There had been a number of similar reported sightings of cross-shaped objects moving around in the sky in previous weeks, mostly in the southern parts of England.

One of the most mysterious sightings was on December 2nd, 1973, at Carteret on the nearby Normandy coast. Two fishermen were setting out at low tide to retrieve their nets at 5.30 a.m. when they saw hovering over the beach an intensely bright yellow object, about two to three metres long and a metre or more in height. The object was emitting a cone-like beam of light downwards, and changed to a bluish-green 'football shape' before moving away at 6.05 am. About five minutes later near Cherbourg, it was reported that a radar installation had picked up an object in the southwest, moving to the north of Cherbourg. It was also reported that the French trawler 'Archipel' had gone off course

near Urville, west of Cherbourg on that same morning, and had then run aground and sunk in the same area. This could have been a coincidence, but it should be noted that there are many examples of magnetic compass effects coinciding with UFO sighting reports.

The most recent incident was at about 3 pm on 23rd April, 2007, and reported in the Guernsey Press on April 26th. Aurigny pilot Captain Bowyer saw two bright yellow, sharply defined objects in the sky ahead of his aircraft. The first object was seen when the aircraft was about 30 miles north of Alderney, and a second similar object was then seen closer to Guernsey. He used binoculars to see more detail, then drew a sketch of the closest object, showing a long shape with pointed ends and a darker, green section towards the right hand side. Passengers also saw the objects, and the sighting was confirmed from another passenger aircraft near Sark. Captain Bowyer had thought of flying closer to the nearest object to investigate, but felt apprehensive and decided to complete his flight into Alderney as planned. In a Radio Guernsey interview two days later he also reported that Jersey Airport had confirmed a definite radar return on its primary, low-level radar system and giving a location of an object about two miles south of Les Casquets, west of Alderney. It was this indicated position which had made him realize that the closest of the objects must be further away, and much larger than he at first thought it was, perhaps as

much as a mile across since it was seen from more than 30 miles away. It was reported that nothing was recorded on secondary radar, used for air traffic control, because this screened out any stationary objects.

There were two main suggestions put forward to explain the sightings. One was that the objects were some kind of secret aircraft on test flights in the area. This seemed very unlikely, because the objects were large and stationary, and were at an altitude confirmed by both pilots as being about 2,000 feet - lower than the altitude of both aircraft, which were at between 3,000 and 4,000 feet.

Another suggestion was that the sightings were caused by a 'sun dog' effect, bright spots of colour which can sometimes be seen, on either side of the Sun, and caused by light reflections from ice crystals in high clouds. This explanation also seems unlikely, mainly because the objects were seen from opposite directions - one pilot looking southwards, and the other to the north from near Sark. Two visitors staying in Sark were also reported to have been very puzzled by the two bright yellow objects in the sky, which they had seen while out that afternoon, and looking north towards Alderney, as mentioned soon afterwards on Radio Guernsey.

The main sighting from north of Alderney lasted about nine minutes. The weather conditions were

described as hazy, and there was a light southerly wind at the time.

Reports from the two pilots and Jersey Airport radar were sent to the Civil Aviation Authority and the Ministry of Defence for investigation, and the Ministry conclusion released not long afterwards was that the objects seen were not considered to be of any defence significance, because the main object described by Captain Ray Bowyer was stationary, and not moving towards the U.K. No other explanation was provided, and the Ministry of Defence does not go further to investigate the cause of such sightings.

Astronomers are perhaps better qualified than most people to identify some of the unusual effects or objects sometimes seen in the sky, but in putting forward suggested explanations there should always be some regard for what is seen and described, particularly when there is more than one report and a quite detailed description as in this case. It is only from a careful study of such reports that some explanation can perhaps be found for what is actually observed. Those few scientists who have taken the trouble to examine some of the better UFO reports have come to accept that there is a very real unexplained phenomenon worthy of more serious investigation.

Geoff Falla

UFOs over Alderney

The first I knew of the UFO sighting over Alderney was from an excited member of the audience at a meeting in Burlington House, London. She knew my home location and brought to my attention a snippet in a free newspaper, "Metro" which simply referred to the sighting, with no details. The meeting wasn't, in fact, an Astronomy meeting but a Royal Society of Chemistry meeting about diabetes and this is what happened when I got back home a few days later.

The Alderney Journal of 5th May was full of the story and gave the Aurigny pilot's report. The first thing that struck me was the accuracy of the drawing, which was so obviously that of a sundog, that I was impressed by the pilot, Captain Bowyer's observation particularly as he's not a scientist. Passengers on the plane and another pilot at a different place also confirmed the sighting.

Almost immediately I got a phone call from Marcel Le Masson of Jersey Astronomy Club who recalled a similar sighting we'd had some years before, coincidentally very close to the same location. Marcel was convinced that this was also a sundog phenomenon and published a description in the 14th May Jersey Astronomy Club newsletter. However, to the contrary, the Guernsey Press was packed with all manner of fanciful notions, and even after I wrote a reply in the 26th May Alderney

Journal, Captain Bowyer remained convinced that his observation could not be a sundog as he'd seen many over the years and was a "trained observer".

The first point to make is that solar phenomena are extremely variable and depend on a fortuitous set of conditions that never repeat exactly. Top of the list is ice crystals in the atmosphere, and lots of them, and of the right shape and orientation. Sally, another pilot confirmed that the mist and cloud structures that day were spot-on for a rarity-a bright sundog with extensions. In extremely favourable cases the bright band from the sun can go right round the sky, just as it was in August last year. On that occasion I photographed a sundog at 120-degrees, something that is extremely rare and a prime candidate for UFO spotters. I think that picture can be found on the Alderney Journal web site:

www.alderneyjournal.com/ufo-photos.php

To get sundogs you need ice crystals in the "needle" form, which are aligned vertically; for some of the other phenomena you need the plate-shaped crystals. I've described this in some considerable detail in a new book to be published by Springer entitled "Lights in the Sky". I also quoted from that the "Novaya Zemlya" Venus sightings in 1843 in the last Sagittarius, April-June 2007 on page 10, not expecting something

similar to be so topical now. More importantly in the book is a definitive chapter by John Watson about UFOs. He discusses the related “wish to see” aspects of the history, and some practical experiments of his own.

For my response in the Alderney Journal of 23rd May, I used a picture taken a month before the 1999 solar eclipse which shows almost precisely what Captain Bowyer drew which should have been enough to convince him.

Editor: The detail of the photograph would not be reproduced well enough in Sagittarius so please follow the link to the Alderney Journal: www.alderneyjournal.com/ufo-photos.php

Where I do, now, have to take issue with him is in totally ignoring my scientific evaluation of his other (extremely precise) observations. Where and when seen.

The 5th May Alderney Journal gave a map with the plane's location, flight path and UFO “positions”. I checked the Aurigny Timetable and found the plane leaving Southampton at 14.45 pm. At the first sighting it was 15.00 pm, which is exactly 2 hours after local Noon BST. If you draw a line on a map between Southampton and Alderney then this is exactly 30 degrees West of due south. Therefore, the plane was flying directly into the Sun.

The first UFO was "seen" just West of Guernsey. If you check the Alderney Journal map, this is 20 or so degree to the right. Sundogs are always 22.5 degrees to either side of the Sun. A few minutes later another UFO was seen a bit more to the right, just right for the distance travelled for the same sundog angle to manifest itself.

A clear scientific explanation, say I.

Sundogs with tails are more often seen in Polar Regions and there's a beautiful painting by Wilson in Antarctica in 1912. The most extensive display of the incredible range of phenomena comes from the 1790s, the Lowitz display. I reported corona seen round Venus and the lunar halo for the 3rd March Lunar eclipse, things that presage bad weather.

That something unusual was in the wind came from a sunset picture I took over Ortac on 19th April. Sundogs usually precede good weather, just as experienced in early May. The final confirming factor was some similar solar phenomena seen at Sir Patrick Moore's party the next day, April 24.

For more information you'll have to wait till the book's publishing.

Michael Maunder

Editor: Michael Maunder's book entitled: Lights in the Sky: Understanding Astronomical and Meteorological Phenomena (Patrick Moore's Practical Astronomy) is published by Springer-Verlag. The book is listed by Amazon.co.uk.

Alderney UFO – a Meteorological View

Tim Lillington, of the Guernsey Airport Met Office has kindly given his permission to publish his comments on the sightings in an email exchange with David Le Conte. Tim was (unfortunately for Sagittarius) on holiday at the time of the sighting.

3rd May 2007

“I haven't done much research into the weather conditions at the time apart from having a quick look at the daily register. My first impression is that with the wind conditions that day (Southerly) and the medium and upper cloud present all hinting at some sort of mixed airflow, this may well be explained by a layer of very different density/humidity air entrained within the main airflow at a fairly low level. Any entrained pockets of air would tend to be almond or oval shaped along a horizontal axis and the boundary layers would create light refraction which would outline the shape of the pocket and alter the visual appearance of the pocket body. The tips of the body could well appear bright as the light refraction concentrates sunlight in certain areas. I imagine this might best be observed from the same level and may not be visible at all from the ground.”

7th June 2007

“I believe the pilot involved has discounted the sun dog idea - I understand that he is familiar with sun dogs and has seen a number on his travels. Of course the weather/atmospheric conditions of the day may have produced an optically

different sun dog to what he is used to”

28th June 2007

“From what I have read about the incident I still feel an optical phenomena of some sort is the most likely explanation be it a sun dog or my "off the cuff" assessment of the effects of light refraction on the boundary layer between differing density airflows. In support of the latter, there has been talk of a darker patch being seen within the shape and this would be the case if light refraction was the cause - there is only so much sunlight available per unit area so for every exceptionally light spot observed there will also be darker spots to compensate etc. (I have seen such occurrences in the past). The other issue that might support this general idea is the speed with which the object was reported to have moved away. If it was simply down to a trick of the light then a change in the observing position would almost certainly lead to an apparent large change in the position of the observed phenomena - and when that change is observed from a speeding aircraft then there could appear to be tremendous speeds involved.

The reports of something being picked up on (Jersey) airport radar seem somewhat conflicting and I am told that the Guernsey airport radar records for that day have long since been overwritten.”

Geoff Falla's regular roundup of articles from popular Astronomy and Space Journals

Exoplanets. A special set of articles focussing on the discovery of extra-solar planets. Most of the more than 200 found so far have been gas giant planets, but there is no doubt that more terrestrial type planets will also be found as the technology of this search improves. (Astronomy Now, April 2007)

Black Holes - Seeing the Unseeable. It is hoped that before long, new technology will prove that black holes exist. A combination of radio telescopes to create an interferometer, and a space-based observatory should eventually be able to identify the 'event horizon' of a black hole at the centre of our galaxy. (Astronomy, April, 2007)

The most colourful Double Stars. Double Stars, many of contrasting colours, are some of the most enjoyable but often neglected objects to observe. A description of some of the best double stars, and a guide to finding them. (Astronomy, April 2007)

The Sky at Night - 50th Anniversary. The longest running television programme in history, the Sky at Night has been presented by Patrick Moore monthly for 50 years. The programme began at the start of the Space Age in 1957, with the first space satellite Sputnik 1 being

launched in that year by Russia, and has followed all of the major developments in astronomy and space research since that time. (Sky at Night - Anniversary Special, April 2007)

Climate Change. The Earth's climate is warming up. Our planet has heated up and cooled down before, causing the ice ages and warmer periods between, but this time it is considered that most of the warming must be due to human activity rather than natural causes such as solar effects. A set of articles on how the climates of the planets have changed, the causes, and moves to lessen the effects on our own planet. (Astronomy Now, May 2007)

Catching Cosmic Rays. Cosmic rays are high energy particles coming from many different sources in space. Individual sources are difficult to identify because cosmic rays do not travel in straight lines, but now NASA's Chandra X-ray space telescope has been able to identify a major source in the supernova remnant Cassiopeia A. Details of the searches helping to unlock some of the mysteries of cosmic rays. (Astronomy Now, May 2007)

The Greatest Astronomers of All Time. The results of a vote to select the ten astronomers considered to be the greatest of all time, with a short account of each of their lives and achievements. (Sky at Night, May 2007)

The South Pole Neutrino Telescope. The Ice Cube project at the South Pole, following on from the smaller

AMANDA project, is planned to detect high energy neutrinos from distant sources, and to reveal more information about mysterious dark matter, supernovae, active galactic nuclei and gamma ray bursts. (Sky at Night, May 2007)

Earth-Like Planet Found. The discovery has been announced of an Earth - mass planet orbiting within the 'habitable zone' of a red dwarf star. The star is Gliese 581, one of the hundred closest stars to our own solar system, at just 20 light years away in the constellation of Libra, and the planet is in a close orbit around the star. (Astronomy Now, June 2007)

Transient Lunar Phenomenon. The Moon is not as dead as sometimes thought. Herschel, one of the greatest astronomers, observed a reddish glow near the crater Aristarchus as long ago as 1783. A review of these continuing temporary effects observed on the Moon, some produced by meteor impacts, but with more than 60 per cent of these transient lunar phenomena (TLPs) recorded from just 12 lunar sites. (Astronomy and Space, June 2007)

The Asteroids. NASA's Dawn spacecraft is due to begin a long journey out to the Asteroid belt in June, with planned visits to two of the largest ones - Ceres and Vesta, between 2011 and 2015. A set of articles focusing on asteroids, officially known as 'minor planets', how they were discovered, and what is currently known about them. (Astronomy Now, June 2007)



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