Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise

July – September 2005

Forthcoming Events

Observatory Public Open Evenings

12th July	9.30 pm
26th July	9.30 pm
2nd August	9.30 pm
9th August	9.30 pm
16th August	9.30 pm
23rd August	9.00 pm
30th August	9.00 pm

Observatory Clean Up Day
Saturday 30th July
10.00 am

Perseids and BBQ
Observatory
Friday 12th August
7.30 pm

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

Inside

Inserts

Star chart

Sunset, sunrise, moonset and moonrise times

Section News

Observatory Clean Up Day is scheduled for Saturday 30th July. As requested in previous years 'many hands make light work' and we would like as many people to attend as possible. We made good progress on external painting and clearing vegetation last year and we would like to carry on the good work and get second coats of paint to all the buildings.

The annual Observatory Barbeque will be held as usual coincident with the peak of the Perseid meteor shower on Friday 12th August. So join in with the sentiment of Debby's article on Meteor Showers and "relax and observe".

Observatory Open Days have been busy throughout the springtime though mostly without younger folk who are no doubt tucked up bed on school nights before it has got really dark. We are open to the public (publicised as "See the Stars") on Tuesday evenings throughout the school holiday period and we will catch up with our younger visitors then. We have purchased a new computer (PC) to control the Meade and also purchased two display monitors which will be invaluable on open evenings. A further green laser pointer has been acquired too.

We have made one unsuccessful attempt so far to observe the Comet Tempel 1 using the CCD camera. This was prior to the Deep Impact Mission on 4th July. We will make further attempts and advise of progress. We have had good viewing of Jupiter in recent months observing both the Great Red Spot and shadows projected from moons on the surface of the planet.

I would like to point out a couple of events being organised in the UK. Norwich Astronomical Society (NAS) is celebrating its 60th Year and a conference has been organised for Saturday 8th October, speakers include (see panel) Heather Couper and Nigel Henbest. Geoff Falla has an article in the 60th Anniversary NAS newsletter which discusses UFO's and in particular has pointed out a sighting publicised by the press by a NAS member in 1954.

Secondly, there is the first Herstmonceux Science Centre Astronomony Festival over the weekend 9th -11th September with viewing using the historical telescopes on Friday and Saturday evening. There is a daily programme of lectures, tours around the telescopes, solar telescope, trade stalls and over 90 hands on science exhibits. Travelling from Gatwick looks to be possible using public transport so costs can be minimised. Please contact myself for further details of both events.

Colin Spicer

Norwich Astronomical Society 60th Anniversary
Astronomy Conference

Saturday 8th October 2005, 9.30 am – 4.30 pm, John Innes Centre, Norwich

Speakers: Dr Robin Catchpole (Institute of Astronomy, Cambridge)
From the Solar System to the Edge of the Universe
Dr David Whitehouse (BBC)
Astronomy and the Media
Prof Paul Murdin (Institute of Astronomy, Cambridge)
The Reality of Black Holes
Dr Heather Couper and Nigel Henbest
Mars; the Inside Story of the Red Planet

Cost: £15 per person (buffet lunch additional £5.50)

Herstmonceux Science Centre Astronomy Festival
Weekend 9th – 11th September
www.the-observatory.org

Warren De La Rue and the 1860 Total Eclipse of the Sun

The two articles by Michael Maunder, published in ***Sagittarius***, gave an appreciation of the contribution of Guernsey-born astronomer Warren De La Rue to photography. I have been studying Warren's life for some years, and this is a summary of a lecture which I gave at the Royal Astronomical Society's National Astronomy Meeting at Birmingham University in April, which focused on the 1860 solar eclipse. A more detailed account will appear in a future edition of La Société's *Transactions*, together with the work of Paul Jacob Naftel on the 1870 eclipse, following the lecture I gave to La Société in February.

Warren De La Rue was undoubtedly the most accomplished Guernsey-born astronomer. In the course of my researches I have examined hundreds of pieces of correspondence and reports, and have amassed a large collection of letters and other references. This account can, therefore, barely scratch the surface of this remarkable man's life. His renown as a Victorian businessman-scientist is based on his work in the fields of early astronomical photography, especially of the Sun, in electricity and chemistry, and in printing processes.

Warren was a member of the De La Rue farming family of Le Bourg in the Forest, being the eldest son of Thomas

De la Rue, who was to become the founder of De La Rue Press, with which Warren's life was to be inextricably involved. He was born in 1815, almost certainly in Mount Durand. A year after his birth, however, the family moved to England, and the rest of his life was spent in London. Nevertheless, he kept in contact with Guernsey, had property interests here, as well as relations, and married Guernsey-born Georgiana Bowles in London in 1840.

Warren grew up in a background of investigation, experimentation and implementation, based on his father's printing firm. He was partly educated in Paris. He applied his scientific and technical abilities to improving printing processes, and developed considerable business acumen, which, with his multi-lingual abilities, benefited the Company international interests. He was clearly a sympathetic person, had a good sense of humour, a caring attitude towards the workforce, an eye for opportunity, and a meticulous attention to detail, a man of "order and energy, on cordial terms with everyone."

By 1850 he had published a number of papers on chemistry and voltaic batteries, and had been elected a Fellow of the Royal Society. In due course, in 1864, he was to become President of the Royal Astronomical Society, and twice President of the Chemical Society.

He was inspired by engineer James Nasmyth to develop an intense interest in observational astronomy, building a superb 13-inch equatorial reflector with a focal length of 10 feet. He applied the newly-discovered wet process to astronomical photography, and provided his telescope with a clock drive, enabling long exposures to be made. With this instrument he drew detailed pictures of the planets, publishing many through De La Rue Press diaries, and took outstanding photographs of the planets and the Moon, including, in 1858, stereoscopic lunar photographs, taken by means of lunar libration. These created much interest, Sir John Herschel likening them to the view a giant with eyes thousands of miles apart would get.

Warren also had success in obtaining photographs of the Sun, and in 1857, at Herschel's instigation, invented the photoheliograph, the first ever telescope dedicated to photographing the Sun, with a view to making a daily record of sunspots. This instrument had a 3½-inch aperture and a 50-inch focal length, and produced an image 4 inches in diameter. The brightness of the image necessitated a very short exposure, and this was accomplished by setting fire to a thread holding a spring-loaded sliding plate, causing a rectangular aperture to flash rapidly across the plate. The instrument was established at the King's Observatory at Kew, and it was this telescope which was to be the prime instrument used for the total eclipse of the Sun, in 1860.

At that time there was considerable confusion and disagreement about the nature of the many phenomena

associated with solar eclipses, exacerbated by the fact that different observers recorded differently what they saw, making scientific deductions extremely difficult. The Astronomer Royal, George Biddell Airy, saw the advantages of applying photography to resolving these perplexing phenomena, including the nature of what we now know as the solar prominences. They had been observed at the 1842 eclipse, and there were theories that they were associated with the Moon itself, or were caused by the Earth's atmosphere, or emanated from the Sun.

Warren De La Rue therefore found himself, together with his photoheliograph, darkroom, and four assistants on an expedition led by Airy to observe the total solar eclipse in Spain on 18 July 1860. This was a major undertaking, with 30 packages weighing nearly two tons.

On arrival at Bilbao the expedition had to journey 70 miles across the mountains to the village of Rivabellosa. The observatory and darkroom were erected, the latter being covered with a canvas which was kept wet in order to lower the temperature by evaporation. The wet collodion process is complex, involving exposure of wet plates and their immediate development, so a darkroom was essential.

On the morning of the eclipse the sky was cloudy, but cleared about midday. The observations were almost scuppered by the inadvertent lighting of a fire by the discarding of matches by an exuberant local assistant who was smoking pieces of glass for use as filters. However, they were highly successful, 40 plates being exposed, including three during totality.

Warren found time to record visual and telescopic observations, using a three-inch Dallmeyer refracting telescope fitted with micrometer lines, in order to measure and record the precise positions of features which appeared during the eclipse. He had devised a filter system so that he could observe without damaging his eyes. Even so, he did suffer eye damage, probably on other occasions when he observed the Sun, and had to give up solar observing for some years.

Warren showed tremendous discipline in the execution of the observing programme. In just three minutes of totality, he started the first drawing after half a minute, took one minute to make the drawing, then for 20 seconds recorded detailed naked eye observations, then measured the position of one of the prominences, re-centred the Moon in the telescope, and resumed with the second drawing. All this while overseeing the taking of the photographs with up to a minute exposure.

It is not surprising that, having described the *wonderful appearance of the heavens* during his brief naked eye observation, he vowed never again to encumber himself with apparatus during a total solar eclipse, a vow I have found myself repeating.

The drawings clearly showed the Moon's motion independent of the prominences, demonstrating that they were indeed attached to the Sun, and not associated with the Moon or the Earth's atmosphere. This observation was fully supported by the photographs, which Warren analysed with extreme diligence, going so far as to invent a plate measuring machine. Additionally, comparison with pictures taken by Father Secchi, some 250 miles away and south of the centre line, confirmed his conclusions.

His highly detailed report to the Royal Society took up 100 pages of the *Philosophical Transactions*, including 18 plates and reproductions of colour swatches which he had used during his telescopic observations to judge the colours of the eclipse phenomena.

For his work Warren was awarded the Gold Medal by the Royal Astronomical Society. He continued to make significant contributions to Victorian science, particularly researching electrical discharges in gases, as well as running the family printing business of which he was now Chairman. The photoheliograph was returned to Kew, being used to make sunspot observations for an entire 11-year solar cycle, and he continued examining the nature of sunspots with his 13-inch reflector.

In due course he gave up observing, and donated his telescope to found the Oxford University Observatory, not only paying to set it up but also for the cost of an assistant to run it for several years. He died in 1889, leaving a fortune of over £300,000, and was buried with his father, Thomas, in the family grave in Kensal Green. He was lauded in many obituaries, which recorded his business acumen, his expertise and contributions in a number of scientific fields, but above all his tremendous character. History still records, however, his major achievement as being his 1860 contribution to an understanding of solar prominences, and we can still observe a lasting tribute to this eminent Guernseyman, as he is commemorated by having a lunar crater named after him.

Warren De La Rue's contributions to astronomy, chemistry, electricity, physics, printing, and particularly to the development of photography, are, I believe, deserving of much further merit than they have heretofore been granted. My researches into his life therefore continue.

David Le Conte

Perseids and Other Meteor Showers

I have always enjoyed seeing meteors, or 'shooting stars' as they are more commonly called. The silent 'whoosh' as they cross the sky, burning out in a dramatic blaze of glory. Although most regular observers of the sky will have now seen more meteors that they can count, there is still something

about them that evokes an almost child-like excitement as another is seen hurtling to its dramatic end 50 to 70 miles above our heads. Meteors can be seen at time of the year, any time of the night and some can be so bright that they are visible in daylight. They may last from just a fraction of a second to several seconds depending on their size and composition.

Meteors are created from tiny particles of dust, many are dust trails that are remnants of long departed comets. As a comet makes its journey around the sun, we see it develop one or more tails of gas and dusty particles, swept from the core of the comet by solar wind. The trail of dust particles, called meteoroids, with many smaller than a grain of sand, remain long after the comet has returned to the far reaches of the solar system. These particles, travelling at vast speeds, enter the atmosphere as meteors. The blaze of light we see is caused by friction as the particle enters the earth's atmosphere at speeds of up to 150 mph. It is estimated that many millions of these particles enter the earth's atmosphere every day, many so tiny that they could never be visible to the naked eye and others so bright that they are seen in daylight causing quite a reaction.

Each August, the Astronomy Section, watch the Perseids meteor shower (usually an excuse for a barbeque!), which peaks around the 12th of the month. This shower is populated by particles left by Swift-Tuttle, a comet that orbits the sun about once every 120 years. About the same time each year the earth encounters the trail of particles left behind for a period from 25th July to 20th August. The Perseids shower peaks about 12th August when the earth encounters the densest part of the trail.

The name of the shower is derived from the position in the sky the meteors are thought to be emanating. If you traced back each meteor on the 12th August to a point of origin you could establish that they came from the constellation of Perseus and hence are named Perseids. In November we see meteors originating from a point in Leo hence the Leonids shower. Many of the showers that we see year after year are populated from the dust of short period comets (which have orbits of less than 200 years) which to some degree is regularly replenishing the showers supply of particles.

The Perseids are not the only August shower, also active at the same time are, to the south, Iota Aquarids, to the north Delta Aquarids, the Kappa Cygnids and the north Iota Aquarids. The frequency per hour of meteors for these showers are 1 – 5 per hour in comparison to between 40 – 100 per hour Perseids.

There are many meteor showers during the course of the year - refer to your Astro Calendar for details. Some, like the Perseids in August, the Leonids in November and the Quadrantids in January regularly produce good numbers ot visible meteors, whilst others may only produce a few an hour. The most famous of comets, Halley, is

responsible for the Orionids, a shower that peaks around the 21st October with a frequency of over 20 meteors per hour. Frequencies generally increase for all showers after midnight, though it is still worth watching as soon as it turns dark. We usually count Perseids from about 10 pm onwards and we are not often disappointed.

I mentioned earlier that meteors travelled at up to 150 miles per hour and the Leonids, Perseids and the Orionids are all around this speed. However, the Geminids, which peak mid December, are more pedestrian and 'stroll' across the sky at about half that speed. Although no meteor persists very long you will nevertheless be able to notice the different speeds.

Not all meteors belong to a specific shower and can be traced back to comets; many are what are termed 'sporadic' meteors. These may have been particles in a comets dust tail once but the comet has long since gone that it cannot be identified. The trail of dust may simply have dispersed. There are 20 or so main showers each year which increases to over 60 when minor showers are included and therefore it is difficult determine whether a meteor is really sporadic or belongs to one of these. Regular watching of the sky will help to trace where a meteor came from and from this you will be able to check if there is an active shower at the time of observation. Most meteors are about 2nd to 3rd magnitude which is a little less bright than the seven main stars in the Plough though many are much fainter. However, occasionally you may be lucky enough to see a 'fireball' which defined as a meteor greater than magnitude -5 (brighter than Venus). Fireballs are caused by bigger particles and can thus last good few seconds and you may see trails break off as it blazes through the atmosphere. A fireball is a truly spectacular sight but they are fairly rare and a dedicated observer may only see 1 or 2 in a year of observing, but believe me, they are worth the wait. A really bright meteor may be large enough to pass through the atmosphere without completely burning up and fall to earth. Once fallen to earth, the solid remains is called a meteorite.

Not all 'shooting stars' are dusty particles, remains of comets, some are man made. Man has been exploring space for nearly fifty years and there are countless satellites in orbit around the earth and, as a result, there is a lot of superfluous junk. From time to time, space junk re-enters the earth's atmosphere and is burnt up providing a firework show in the same way as meteors. As you become more experienced in observing meteors you can distinquish what is likely space junk. Firstly, the fiery trails will be brighter, lasting longer since space junk is likely to be much bigger than dust grains. Secondly, the colour may be different as different elements burn with different colours. A few years ago, in December, several people in Guernsey and the South of England spotted a very bright fireball and described colours and bits breaking from the main fireball, unfortunately

none of the observers were astronomers. However, from the information given, members of the Astronomy Section were able to follow this up and we discovered that earlier that day a rocket had been launched, placing a new satellite in orbit and the fireball was discarded rocket parts re-entering the earth's atmosphere. This is not common occurrence though nevertheless a spectacular sighting if you are luck enough to observe it.

The Perseids will peak on the 12th August (though nights either side are also suitable for viewing). What could be better than a summer's night to recline in the garden with a glass of wine in hand and watch the celestial fireworks. The winter months, October to January, also offer showers that produce reliable numbers but forget lounging and wine, think thermal clothing and hot drinks!

Debby Quertier

Shooting Stars.

On August 11th or 12th each year,
Especially if the sky is clear,
We stay up till the midnight hour,
To watch the Perseid meteor shower.

Descending through the air they plummet,
Remains of the Swift-Tuttle comet,
Sometimes quite a grand display,
As they glow and burn away.

Most of them are just a streak,
Even at the shower's peak,
But some, and almost without fail,
Will leave a bright persistent trail.

So while we wait for skies to darken,
Looking up in expectation,
We hope that they may fall in torrents,
These meteors called 'the tears of St Lawrence'.

Geoff Falla

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

The Weirdest Star in the Galaxy. More than 25 years ago, a very mysterious star was discovered in our galaxy. The star is part of a double system, and is emitting energy in two narrow jets, similar to what is seen being emitted from some galaxies. The behaviour of the star is under investigation. (Astronomy, March 2005)

2005 - Einstein Year. This year has been nominated as Einstein Year, as it is the 50th year since his death, and the 100th anniversary of his Theory of Relativity, that light speed cannot be exceeded but that time is variable. A summary of his life and work, with theories which still form the basis of modern physics. (Astronomy and Space, April 2005)

Titan - A Whole New World. Saturn's largest moon seems to be one of the most dynamic places in the solar system. The Cassini probe and Huygens lander have revealed river channels and evidence of methane rain, Earthlike processes with different ingredients. (Sky and Telescope, April 200.)

Black Holes and Galaxy Evolution. Evidence that black holes at the centre of galaxies playa major part in shaping their surroundings. It seems that galactic evolution is closely linked with the black holes at their centres. (Sky and Telescope, April 2005)

The Fading Sun. Global warming now seems to be generally accepted, but it has been established that the amount of sunlight actually reaching the Earth's surface has declined markedly in recent years. This is seen as having some effect at least in reducing the amount of global warming. (Astronomy Now, April 2005)

Planetary Nebulae. A set of articles about these often beautiful objects, usually the remnants of a dying star. The history of planetary nebulae, from the discovery of the first (M27) by Charles Messier in 1764, and why they have such different shapes, possibly because of double stars or the effects of magnetic fields. (Astronomy Now, April 2005)

Superflare- from the Other Side of the Galaxy. An account of a high energy pulse of radiation from a neutron star which reached Earth in December 2004. Although the star is 50,000 light years away, the energy received from the flare was greater than from a powerful solar flare.
(Sky and Telescope, May 2005)

Brown Dwarfs - The Link between Stars and Planets. The search for brown dwarf-type objects recorded the first discovery in 1994. Further information about these objects may be important for theories of stellar evolution, and for understanding the existence of giant planets around other

stars. (Sky and Telescope, May 2005)

The Universe. Part 2 of a three part series. A hundred and one items of information as currently known regarding our galaxy, the life cycle of stars, and cosmology. (Astronomy Now, May 2005)

Development of the Spectroscope. The story of how the spectroscope was developed for use in astronomy, allowing the composition of stars to be analysed. The 19th century work by William Huggins, and colleague William Miller led to the two men being awarded the Royal Astronomical Society's Gold Medal for their groundbreaking achievement.(Astronomy Now, May 2005)

Planet Hunt. During the last ten years almost 140 planets have been identified in orbit around other stars. The different ways being used to detect the existence of these planets. (Astronomy Now, May 2005)

The Secrets of Saturn's Moons. The Cassini spacecraft in orbit around Saturn has discovered much more information about its moons. One of many articles in a new information-packed magazine from the B.B.C. (Sky at Night: Issue 1, May 2005.)

Asteroid Sample-Return Mission. A Japanese spacecraft, launched in 2003, is due to rendezvous with the near-Earth asteroid Itokawa in September. If successful, the spacecraft will be the first to return a sample from one of the minor planets, and is due back in 2007. (Sky and Telescope, June 2005)

Comet Mission Deep Impact. On 4th July a NASA spacecraft is due to make a flyby of comet Tempel 1**,** sending an impactor into the path of the comet. A large crater is expected to be produced, and the resulting material from a comet's nucleus analysed for the first time to discover more about its composition. (Sky and Telescope, June 2005)

Uncovering Europa. Jupiter's moon Europa is thought to have a good possibility of life in an ocean below its icy crust. Large cracks in the ice, and the effect of impacts on the surface could have brought material from below the ice much closer to the surface. (Astronomy Now, June 2005)

Through the Pinhole. The New Worlds Imager project involves a telescope and pinhole camera system, shielding the light from other stars so that any planets around them can be more easily detected. The project is at an early stage, and depends on allocation of NASA funding for further development. (Astronomy Now, June 2005)

Earth's Gamma Ray Mini-Bursts. It has been discovered that brief bursts of gamma rays are originating from the Earth's atmosphere. The bursts of energy are found to be as powerful as those associated with neutron stars or black holes, and are thought to be

linked with electrical activity in the upper atmosphere. (Astronomy Now, June 2005)

MOUNTAIN Came to Guernsey

The Space Telescope Science Institute, which operated the Hubble Space Telescope, has a new Director: Dr Matt Mountain, and there is a Guernsey link. Dr Mountain was one of the delegates attending the Royal Astronomical Society's National Astronomy Meeting conference held in Guernsey in 1999, which the Astronomy Section of La Société Guernesiaise was involved in. He was at that time Director of the Gemini Observatory in Hawaii, which has twin 8-metre telescopes. Those readers of Sagittarius who attended the exhibition which was part of the conference at Beau Sejour may remember the model which was displayed there.

eBook Universe

I recently received a surprise all the way from Australia. Dr Lindsay Ford, who has relations in Guernsey and had visited them four years ago, sent a CD Rom containing a book on astrophysics, entitled The Universe. It is in the form of a slide show, containing lots of pictures sourced from the Internet, together with text. Dr Ford has kindly given permission to copy and distribute it to members, so if any member is interested please let me know.

David Le Conte

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