Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise

January – March 2013

Forthcoming Events

Spring Star Festival Sark

12th - 14th April 2013

Dr Marek Kukula

Dr Chris Lintott

Steve Owens

WEA Course

Thursdays 8.00 pm at the Observatory

7th February – 14th March

Section meets at the Observatory every Tuesday evening at 8.00 pm

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Star chart

Sunset, sunrise, moonset and moonrise times

Sir Patrick Moore (1923-2012)

We must all have been deeply saddened at the death of Sir Patrick Moore at the age of 89, on 2012-12-09 (the format he insisted dates should be written).

Along with other members of the Astronomy Section, I first met him in 1993, when, as Section Secretary, I invited him to Guernsey to give a public lecture and to open the Observatory's new telescope building, and he soon became a friend. To my surprise, he nominated me as a Fellow of the Royal Astronomical Society, and we remained in contact for the best part of 20 years.

Sir Patrick Moore at the Guernsey Observatory

He visited Guernsey several times, lecturing, meeting and eating with Section members, and, in 1999, opening the Solar Eclipse Exhibition at the Guernsey Museum. In 2000 he came again, visiting the Observatory to see our new telescopes. He was always very encouraging and supportive, not just of our Guernsey activities (emphasising the serious astronomy we could do with our then 14-inch telescope), but to everybody with an interest in astronomy. He was, indeed, an inspiration to thousands of the young, and older, not just through his myriad books, but through his ability to relate to people.

I visited him at his home in Selsey on two occasions. First in 2006, and again in 2011, when he invited me to a celebration of his 88th birthday and the 700th edition of his long-running television programme *Sky at Night*. That was attended by a representative cross-section of his many friends: a mix of professional and amateur astronomers, celebrities, and ordinary people who had benefited from his inspiring character.

Sir Patrick was an astronomer with an ability to communicate his profession to everyone. I was amazed at how he could talk to diverse groups, not only at precisely the right level, but also for the precise amount of time allotted to the event. He was a gentleman, with impeccable manners, a fine sense of humour, and firmly expressed views on many subjects. He was also very generous. When he lectured in 1993 to a packed Beau Sejour theatre, he not only charged no fee, but also wrote out a cheque to the Astronomy Section

to cover the cost of his flight and accommodation.
His energy seemed boundless. When he visited us in 1993, having just turned 70, he came out of a dinner at 11 pm, noticed that the skies had cleared, and, despite the fact that most of us were ready to retire to bed, insisted on going to the Observatory, where he sketched a telescopic view of Venus.

He poured out books, typed on his reliable 1908 Woodstock typewriter. He once told me that he had a deadline to complete a book in three days, and would stay up all night to complete it. He personally responded to all letters, and would dash out brief but pertinent notes when the situation required it.

Regrettably, his health deteriorated in recent years, and he became virtually house-bound. When I visited him he expressed sadness that he could no longer visit Guernsey, and wished us well. His death means the departure of a British icon, and represents a sad loss to popular astronomy.

David Le Conte

Astronomical events in 2013

This year we have the possibility of two naked-eye comets to look forward to, one of which has the chance of being spectacular. As usual there will be good opportunities for observing the planets, and conditions should be favourable for two major meteor showers. There will, however, be no worthy eclipses. We have to wait until 20 March 2015 for a partial solar eclipse, and 28 September 2015 for a lunar eclipse, which will be total.

VISIBILITY OF THE PLANETS

Mercury will be visible in the periods around its greatest elongations:

Date	Elongation	Direction to look	Time
16 February	18.1º Eastern	Low in West	After sunset
31 March	27.8º Western	Low in East	Before sunrise
12 June	24.3º Eastern	Low in West	After sunset
30 July	20.6º Western	Low in East	Before sunrise
09 October	25.3º Eastern	Low in West	After sunset
18 November	19.5º Western	Low in East	Before sunrise

The best times will be the early evenings in mid-February, the mornings from late July to early August, and mornings in mid-November. It will be very close (0.3º) to Saturn on 26 November, low in the east before sunrise.

Venus continues as the 'Morning Star' in the east until March. After superior conjunction on 29 March it will appear in the evenings in the west for

the rest of the year. It will be 3½º below Saturn on 18 September, at maximum eastern elongation on 01 November, and maximum brightness (-4.7) on 07 December.

At the beginning of the year **Mars** appears low in the south-west in the early evenings. It will move lower, and will be at superior conjunction on 18 April. It will then start appearing in the morning, low in the east, and will remain visible for the rest of the year, getting higher and higher as the months go by, and moving towards the south. It will be within 1º of Jupiter on 22 July. Its next opposition will be 08 April 2014.

Jupiter was at opposition on 03 December 2012, and will, therefore, continue to dominate the evening skies during the early part of 2013, being visible until the end of May. Towards the end of that month it will make a fine close grouping with Mercury and Venus, low in the north-west after sunset. After superior conjunction on 19 June it will appear before sunrise in July, low in the east, and will then move higher, towards the south, being visible for the remainder of the year.

It should again provide good views of its moons, atmospheric bands on its disc, and the Great Red Spot. Transit, shadow and occultation events involving Jupiter's moons can be calculated using a Java script at http://www.skyandtelescope.com/observing/objects/planets/3307071.html?page=2&c=y (remembering to enter the date in the US format: month/day/year). They can also be simulated on software such as StarryNight (http://www.starrynightstore.com/).

The transit times of the Great Red Spot can be found at http://www.skyandtelescope.com/observing/objects/planets/Transit_Times_of_Jupiters_Red_Spot.html. They can also be seen on StarryNight software, but remember to set the Jovian System longitude to the current value (184º).

Saturn starts the year as a morning object, rising in the east by 03.00. It will rise earlier and earlier, and by March will be rising by 23.00. It will reach opposition on 28 April, when it will be visible all night. By May it will appear in the south-east by 21.30 BST. It will remain fairly low, however, being about -10º declination. In the autumn it will be low in the west, and it will disappear by late October.

On 22 March **Uranus** will be just one arc-minute from Mars. It will be at opposition in Pisces on 03 October, at magnitude 5.7. **Neptune** will be at opposition in Aquarius on 27 August at magnitude 8.

DWARF PLANETS

Pluto will reach opposition on 02 July, at magnitude 14, in Sagittarius. In the early part of the year **Ceres**, in Taurus, is well placed for telescopic observation, at magnitude 6.6. The other three dwarf planets (Eris, Makemake and Haumea) are too faint to be seen in most amateur telescopes.

ASTEROIDS

The brightest asteroid, **Vesta**, at magnitude 6.5, is also in Taurus, and should easily be visible in telescopes in the early part of the year. NASA's Dawn spacecraft left it in September 2012, having taken thousands of pictures and amassed huge amounts of data, and is now heading towards dwarf planet asteroid Ceres. Although Vesta appears close to Ceres in the sky, there is a lot of space between them, and Dawn will not arrive at Ceres until February 2015. For more information see http://dawn.jpl.nasa.gov/.

ECLIPSES

It is again a poor year for eclipses.

There will be a minuscule and brief partial eclipse of the Moon on 25 April, with it just clipping the edge of the Earth's shadow. It will start at 20.51 BST, shortly after moonrise, and will end barely 32 minutes later, at 21.23. At maximum (21.07) just 2 percent of the Moon will be eclipsed, so it will be hardly noticeable. Nevertheless, it will be our best eclipse of the year! It will be totally within the penumbra part of the shadow, which it will leave at 23.13.

A very minor penumbral eclipse of the Moon will start on the morning of 25 May at 04.42 BST, ending after the Moon sets at 05.30. At maximum, at 05.09, only 4% of it will be in the Earth's penumbral shadow. I challenge anyone to notice this!

There will be a slightly better, but still minor, penumbral eclipse of the Moon on the night of 18/19 October, starting in the late evening, at 22.48 BST, maximum at 00.50, and ending at 02.52. At maximum 79% of the Moon will be in the penumbra.

An annular eclipse of the Sun will be visible from Australia and the South Pacific on 10 May. On 03 November a hybrid annular-total solar eclipse will be visible from Africa.

OCCULTATIONS AND CONJUNCTIONS

On 08 September Spica will be occulted by the 3 day-old Moon during daylight, from 14.40 to 16.05 BST.

A list of planetary conjunctions can be found at http://en.wikipedia.org/wiki/List_of_conjunctions_(astronomy). The following are the most significant ones.

08 February	Mercury and Mars (0.3º)
22 March	Mars and Uranus (1´)
06 April	Venus and Mars (0.7º)
07 May	Mercury and Mars (0.4º)
25 May	Mercury and Venus (1.4º)
27 May	Mercury and Jupiter (2.4º)
28 May	Venus and Jupiter (1.0º)
20 June	Mercury and Venus (1.9º)
22 July	Mars and Jupiter (0.8º)
18 September	Venus and Saturn (3½º)
26 November	Mercury and Saturn (0.3º)

METEORS

The **Quadrantids** with up to 80 meteors per hour, peak on 03 January. With the Moon near last quarter the conditions are quite favourable. The

Perseids peak on 12 August, again with up to 80 per hour. Conditions are favourable, especially after the near first-quarter Moon sets at 22.30 BST. The **Leonids**, characterised by fast meteors with persistent trains, peak on 17 November, but coincide with the full Moon. The richest annual shower, the **Geminids**, with some 100 per hour, peaks on the night of 13/14 December, but will also be adversely affected by a bright Moon.

There are, of course, many other, more minor meteor showers during the year, and sporadics may be seen at any time.

COMETS

The most exciting comet appearance could be **Comet ISON** (designated 2012 S1). It was discovered in September 2012 by a telescope in Russia, part of the International Scientific Optical Network (hence its acronymal name). Still very faint at the beginning of 2013, it should appear in the morning sky in September at magnitude 11 – within the reach of our telescopes – when it will be just 2º from Mars. By the end of October it will have brightened, perhaps becoming visible to the naked eye, and reaching a maximum of 54° from the Sun. It will then close rapidly with the Sun, passing within half a degree of Spica on 18 November, and appearing close to Mercury and Saturn on 23 November.

It is predicted to have a perihelion distance (ie closest approach to the Sun) of 0.013 au (just 1.2 million miles) on 28 November, and is therefore classed as a sun-skirting or sungrazing comet. By that time it could be a brilliant naked-eye object, perhaps even visible in daylight, with a possible magnitude of -6 or even -13, but very close to the Sun. Precautions to avoid eye damage must be taken, by blocking out the Sun from view.

On 22 December the comet will pass 5° from the globular cluster M13. Its closest approach to the Earth will be on 26 December, at a distance of 0.4 au (37 million miles). Moving north, it will be some 3° from the north celestial pole around 08 January 2014. By that time it will be fading to beyond naked-eye visibility, but should still be visible in our telescopes.

This all assumes, of course, that the comet will not just fizzle out as some other comets have done, including some which were expected to be equally spectacular.

The other bright comet this year is **PanSTARRS** (2011 L4). It will appear from perihelion in the southern hemisphere to be visible in our northern skies in late March, when it may well be a naked-eye object. It will then be an early evening object in the north-east sky. Its maximum magnitude, although uncertain, is likely to be at least 4, and possibly much brighter, with a 10° tail. Over the next few weeks it will move northwards and higher in the sky, but fading, getting too faint for observation by June.

Detailed comet predictions for 2013 are available on the website of the British Astronomical Association's Comet Section: http://www.ast.cam.ac.uk/~jds/preds13.pdf.

Check the Heavens-Above website (www.heavens-above.com) for star charts showing comet positions.

THE SUN

Sunspot numbers (and solar activity) have varied considerably over the last couple of years, but the solar cycle is expected to peak during 2013. Displays of the aurora borealis (and australis) can be expected at high latitudes, and may occasionally be spotted from Guernsey, possibly as a red (or green) glow over the northern horizon. Details of sunspot numbers are at www.ips.gov.au/Solar/1/6, and auroral alerts, with lots of other information, is at www.spaceweather.com.

EQUINOXES AND SOLSTICES

The following are the dates and times of the equinoxes and solstices in 2013:

Vernal Equinox	20 March	11.02 UT
Summer Solstice	21 June	06.04 BST
Autumnal Equinox	22 September	21.44 BST
Winter Solstice	21 December	17.11 UT

SATELLITES

The International Space Station (ISS) is regularly visible from Guernsey, looking like a very bright star crossing our skies from west to east. Also of interest are flashes from the Iridium satellites, and periodic launches of the ISS servicing spacecraft such as Soyuz or SpaceX Dragon. Many other, fainter, satellites appear every night. Details of the times and directions of visibility (together with sky charts and much more) can be obtained from www.heavens-above.com, linked from our website, www.astronomy.org.gg.

WEA COURSE

The Astronomy Section's annual six-week WEA "Star Gazing" course at the Observatory starts on 07 February. As always, it has sold out, so no places are available on this year's course. Early enrolment is recommended for the 2014 course. It is likely to be announced first at www.wea.org.gg, or telephone WEA Guernsey at 237888.

OPEN DAYS

The Observatory will be open to the public again for a number of Thursday evenings during the year, including weekly openings during the summer holidays (25 July to 29 August). Details will appear in the Astronomy Section newsletters, on the website (www.astronomy.org.gg) and in local media.

David Le Conte

REFERENCES

SkyMap Pro and *Starry Night Pro* software
RAS diary 2013
Wikipedia

CALENDAR OF ASTRONOMICAL EVENTS

Month	Date	Time	Event
January	02	04.38 UT	Earth at perihelion (147 million km)
January	03		Quadrantid meteor shower (favourable)
Jan-Mar		Morning	Venus visible
Jan-Apr		Evening	Mars visible
Jan-May		Evening	Jupiter visible
Jan-Dec		Morning – Evening	Saturn visible
February	07	20.00 UT	WEA course starts at Observatory
February	08	After sunset	0.3º conjunction of Mercury and Mars
February	16	After sunset	Mercury at greatest eastern elongation
March	14	20.00 UT	WEA course – final class
March	20	11.02 UT	Vernal Equinox
March	22	After sunset	1 arc-min conjunction of Mars and Uranus
March	Late	Early evening	Comet PanSTARRS appears in north-east
March	29		Venus at superior conjunction
March	31	01.00 UT	BST starts
March	31	Before sunrise	Mercury at greatest western elongation
April- Dec		Evening	Venus visible
April	06	After sunset	0.7º conjunction of Venus and Mars
April	18		Mars at superior conjunction
April	25	20.51 - 21.23 BST	Minor partial umbral eclipse of the Moon
April	28		Saturn at opposition
May- Dec		Morning	Mars visible
May	07	Before sunrise	0.4º conjunction of Mercury and Mars
May	25	04.42 - 05.30 BST	Minor partial penumbral eclipse of Moon
May	25	Early evening	1.4º conjunction of Mercury and Venus
May	27	Early evening	2.4º conjunction of Mercury and Jupiter
May	28	Early evening	1º conjunction of Venus and Jupiter
June	12	After sunset	Mercury at greatest eastern elongation
June	19		Jupiter at superior conjunction
June	20	Early evening	1.9º conjunction of Mercury and Venus
June	21	06.04 BST	Summer Solstice
July – Dec		Morning	Jupiter visible
July	02	All night	Pluto at opposition (magnitude 14)
July	05	15.44 BST	Earth at aphelion (152 million km)
July	22	Morning	0.8º conjunction of Mars and Jupiter
July	25	Evening	Observatory Open Evenings start
July	30	Before sunrise	Mercury at greatest western elongation
August	12		Perseid meteor shower (favourable)
August	27	All night	Neptune at opposition (magnitude 8)
August	29	Evening	Observatory Open Days end
September		Morning	Comet ISON appears (faint)
September	08	14.40 - 16.05 BST	Daytime occultation of Spica by the Moon
September	18	Evening	3½º conjunction of Venus and Saturn
September	22	21.44 BST	Autumnal Equinox
October	03	All night	Uranus at opposition (magnitude 5.7)

October	09	After sunset	Mercury at greatest eastern elongation
October	18/19	22.48 to 02.52 BST	Partial penumbral eclipse of the Moon
October	27	02.00 BST	BST ends
October	End	Morning	Comet ISON greatest elongation; bright
November	01	Evening	Venus at maximum eastern elongation
November	17		Leonid meteor shower (unfavourable)
November	18	Morning	Comet ISON close to Spica (0.5 degrees)
November	18	Before sunrise	Mercury at greatest western elongation
November	23	Morning	Comet ISON close to Mercury and Saturn
November	26	Before sunrise	0.3º conjunction of Mercury and Saturn
November	28	Morning	Comet ISON at perihelion (0.013 au)
December	07	Evening	Venus at maximum brightness (-4.7)
December	13/14		Geminid meteor shower (unfavourable)
December	21	17.11 UT	Winter Solstice
December	22	Morning	Comet ISON 5º from M13 globular cluster
December	26	Morning	Comet ISON at perigee (0.4 au)

Guernsey Astronomers Past and Present

This article is based on my lecture at the Guernsey Museum on the 2nd May 2012, and is necessarily just a summary of the achievements of a large number of Guernsey men and women who have made some contribution to astronomy.

The first inhabitants of Guernsey who had an awareness of the movement of celestial objects must have been those who, in Neolithic times some 5000 years ago, constructed the many megalithic tombs whose orientations relate to sunrise, probably just by using the direction of the rising Sun to fix the tomb's axis on the day construction was started.[1]

They were not, of course, astronomers in the modern sense, and we cannot know the extent of their knowledge. But the lack of light pollution would have provided stunning night skies, and they must have been well aware of the patterns of the stars, their diurnal and seasonal movements, the wandering motions of the planets, the phases and motion of the Moon, and unexpected appearances of meteors, comets and eclipses.

Guernsey's history is bound up with the sea, and its many mariners must have been proficient in celestial navigation. Indeed, their very survival depended on it. I have not yet, however, found any treatises in the subject attributed to Guernseymen.

Our first candidates were people who, although not astronomers *per se*, nevertheless demonstrated an interest in astronomy, sometimes for pecuniary reasons.

In 1714 the British Parliament offered a prize of up to £20,000 (over £2 million today) to anyone who could solve the Longitude Problem, that is to

determine the longitude of a ship at sea. No doubt with an eye on the prize, **Henry de Saumarez** (c1666 – 17??) invented a device called the 'marine surveyor' to measure the distance travelled by a ship. It involved an underwater rotor connected to an on-board dial and bell, which, in trials on inland waters, was designed to ring every 10 feet. He built models and prototypes, tested them on the canal in London's St James's Park, and measured the currents in the Thames estuary. The Royal Society published accounts of his invention in the *Philosophical Transactions*. He worked hard to promote his invention by petitioning the King, the Royal Society, the Admiralty, Trinity House, the Patent Office and Sir Isaac Newton, but all concluded that it was wholly impracticable. So, despite all his efforts the marine surveyor languished and was never adopted.[2]

Elisha Dobrée (1756 - 1844), a Douzenier and Constable for St Peter Port, kept a weather journal and diary from 1777 to 1844. He included entries about a solar eclipse on 3 April 1791, and a bright comet on 9 October 1811 (the 'Great Comet of 1811').

Richard Saumarez (1764-1835), a brother of Admiral Lord James de Saumarez, was an accomplished London surgeon with an interest in what was then called natural philosophy. His understanding of physics was somewhat flawed, however. In an 1812 publication[3] he claimed that Sir Isaac Newton was wrong in his observation that sunlight was composed of all the colours of the rainbow, as otherwise everything sunlight fell on would appear of those colours. He further claimed that the Sun was not hot, because as you went up a mountain it got colder, even though you were closer to the Sun; that earthquakes were caused by the ignition of materials through fermentation of organic matter; and that comets prevented the dissipation of the Earth's atmosphere into space. In the final chapter, on the Laws of Motion, he challenged Newton's Laws of Gravity, through equally spurious arguments.

The poet Samuel Taylor Coleridge, who was well acquainted with Richard Saumarez, had rather sceptical views about his deductions. Saumarez, in common with many natural philosophers of his time, worked from the premise that science should support religious concepts. That premise was also evident in the work of our next Guernseyman.

John MacCulloch (1773-1835) was born in Guernsey and published a number of papers on Guernsey geology and horticulture. He is reported as being proficient in many disciplines, including astronomy. Although he does not appear to have left any records of astronomical observations or theories, his understanding of the physical and natural sciences was clearly far more sound than that of Richard Saumarez's. He was initially a practicing surgeon, but became a leading geologist and a Fellow of the Royal Society.

Nevil Maskelyne, the Astronomer Royal, had carried out an experiment in 1774 to determine the density of the Earth, using the Scottish mountain Schiehallion, which is relatively isolated and symmetrical. In 1811 John Playfair, Edinburgh Professor of Mathematics, undertook a study of the rocks of Schiehallion to arrive at a better estimate of its density. MacCulloch criticised Playfair's analysis, gave up his medical practice and was employed by the Government on several geological projects, including surveying other mountains for the purpose of repeating the experiment. This work led eventually to his comprehensive survey of Scottish geology. He was also employed in analysing possible geological effects on instruments used in an accurate meridian mapping survey.

This renowned but controversial geologist had an unfortunate death just weeks after marrying for the first time at the age of 61. He was injured in an accident involving his horse-drawn carriage. His leg had to be amputated, and being surgically trained himself, is reported as giving the doctors directions while they were carrying out the operation! Regrettably he did not survive.

His major map of the geology of Scotland was published posthumously, and is still in print. Another posthumous publication, as requested in his will, was a thesis in three volumes endeavouring to show, by geological and other analysis, that the Earth, and by extension the universe, had not existed for eternity but had been created by a supreme being.[4]

In 1822 **James Hayward** advertised in the Guernsey *Star* as a "private teacher of geography and the use of the globes, elements of astronomy, & c." to young ladies. In the same year **George Ramsden**, Master in the Royal Navy with 40 years experience, offered to teach "Navigation, and the Method of working Lunar Observations and Time Keepers, on reasonable terms".

During the 19th century there was enormous public interest in astronomy, and many references in local newspapers to astronomical events, such as meteors, eclipses, comets, and atmospheric phenomena. The 'Great Comet of 1843' was the subject of a letter in *The Star* of 20 March of that year by Guernsey

archaeologist **Frederick Corbin Lukis** (1788-1871). He followed this with a long letter on 31 March 1848 about the sighting of a spectacular display of parhelia. The newspaper referred to "a very faithful drawing of the display" by **N F Ellis** of St Jacques. A further long letter by **Robert W Kyle** of George Place about the history of parhelia sightings appeared on 5 April 1848. The *Illustrated London News* of 8 April 1848 published a drawing "furnished by a correspondent in Guernsey", presumably the aforesaid Mr Ellis.

Lukis's journal of 8 March 1867 recorded a partial eclipse seen from Yorkshire. His archive also includes a record of the orientations of megalithic tombs in the Morbihan area of Brittany, although he apparently made no deductions from these measurements.

Samuel Eliott Hoskins (1799-1888) was a Guernsey physician with a special interest in meteorology, being elected a Fellow of the Royal Society in 1843, both for his medical and meteorological work. From that year until 1881 he maintained detailed daily weather records in strict accordance with Greenwich Observatory practice, largely to further his claim that the island would be a suitable resort for invalids on account of its benign climate. His 'meteorological registers' included records of astronomical events: 6 solar eclipses, 6 lunar eclipses, 13 meteor observations, and 4 comets (including the 1843 comet recorded by Lukis), as well as atmospheric phenomena such as solar and lunar halos (11 and 28 respectively), auroræ (26), parhelia (5), lunar rainbows (3), and a paraselene.

Samuel Elliott Hoskins

I have previously published a detailed article about his observations[5], but it is particularly worth noting here his records of the major annular eclipse of 15 March 1858, which was 97% partial in Guernsey. Although the weather was poor, he did record changes in the amount of ozone during the eclipse, and this interesting observation was reported to the Meteorological Society by James Glaisher, the Royal Greenwich Observatory meteorologist.

The 1858 solar eclipse was also the subject of the first astronomical photographs taken in Guernsey which I have found. These were by **Thomas Lukis Mansell** (1809-1879), an accomplished landscape photographer, and I included them in the aforementioned article. In a letter to

the Guernsey *Star*, **George Kemp** reported that he too had attempted to photograph the eclipse, without much success. In the meantime the convict ship *Lord Raglan*, carrying two men deported from Guernsey to Australia, was off the coast of Portugal on the centre line of the eclipse, but its log recorded that, being overcast, it was not seen until the final stage of partial eclipse.

The accolade of Guernsey's foremost 19th century astronomer must undoubtedly go to **Warren De La Rue**, RAS (1815-1889), about whom I have written extensively.[6] Working in London, he was Britain's leading astronomical photographer of the third quarter of the century, an outstanding pioneer in his field, specialising in photography of the Moon and the Sun. He created not only a superb equatorial reflector but also the first instrument specifically designed to photograph the Sun – the photoheliograph.

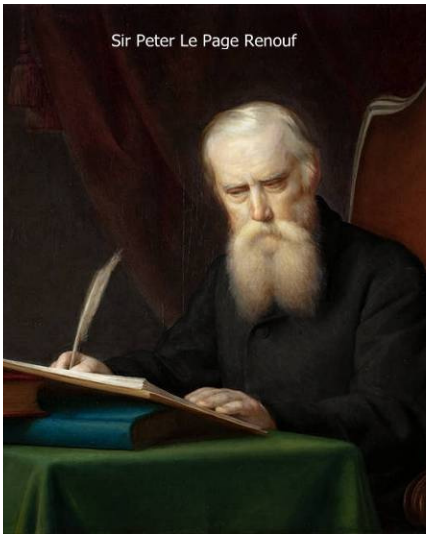
His major accomplishment was his photography with this instrument of the total solar eclipse of 1860 in Spain, by which he demonstrated conclusively that prominences were a solar phenomenon. He published many astronomical papers, was President of the Royal Astronomical Society (receiving its Gold Medal in 1862), twice President of the Chemical Society, and Vice-President of the Royal Society. A lunar crater is named after him – the only Guernseyman with this honour.

Guernsey landscape artist **Paul Jacob Naftel** (1817-1891) was part of a Royal Astronomical Society expedition to Spain to paint a total eclipse of the Sun in 1870, the object being to depict accurately the solar corona and the colours of the terrestrial atmosphere.[7]

Sir Peter Le Page Renouf (1822-97) was an outstanding scholar, being Professor of Ancient History and Oriental Languages in Dublin, Government Inspector of Schools in England, and Keeper of Oriental Antiquities at the British Museum. He published extensively on ancient Egyptian texts, including detailed analyses of astronomical references.

He clearly had an early interest in astronomy. While tutoring in France in 1847 he showed his young pupil a partial solar eclipse, recording that the little boy got soot on his nose from the smoked glass used as a filter. Later he

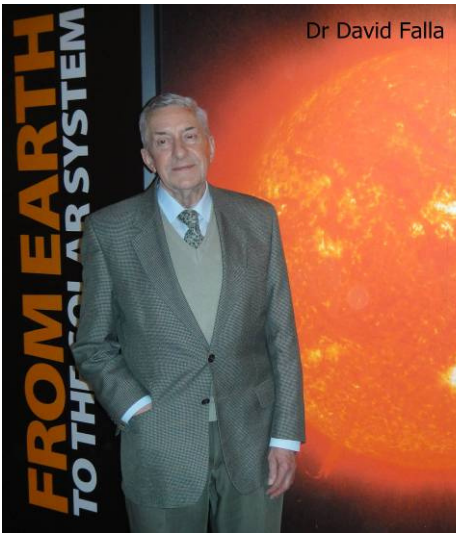
visited the Paris Observatory, and clearly gained an in-depth knowledge of the positions and motions of the stars, as shown by some half-dozen publications specifically on the subject of Egyptian astronomy. Although living most of his life in Britain, he was buried at St Joseph's Church in Guernsey, a peal of bells being donated in his memory by his widow.



I have published details of the introduction of Greenwich Mean Time to Guernsey, including the role of clockmaker **John Le Lacheur** in subscribing to the 10.00 am telegraphic time signal from the Greenwich Observatory in the 1870s.[8]

Adolphus Collenette (1841-1922), the grandfather of the writer Elizabeth Goudge, was a dispensing chemist and manufacturer of sterilized mineral waters. He was a Fellow of the Chemical Society, and also a geologist and meteorologist, taking over from Samuel Elliott Hoskins the recording of the island's weather. He had a considerable knowledge of astronomy, and, between 1890 and 1910 gave eight lectures to the Mechanics Institute, which met at the Guille-Allès Library. These were popular, over 300 people attending his lecture on Comet Halley. Two others, **Albert Davis** and **Francis Holiday** also each gave one lecture on astronomy to the Institute, in 1894 and 1901, respectively.[9]

La Société Guernesiaise was founded as a learned local studies society in 1882, but it took until 1972 for an Astronomy Section to be formed, **Dr David Falla** (1934-) being a prime mover in its foundation. A particle physicist with a special interest in theoretical astrophysics, David Falla, now retired and still a member of the Section, was for many years a lecturer at the University of Aberystwyth. Previous to that appointment he carried out research at the Universities



of Bristol, Manchester and London, including work at CERN in Geneva and at the Rutherford Laboratory. He is a Fellow of the Royal Astronomical Society.

These days many Guernsey people are interested in astronomy, largely through the efforts of the Astronomy Section of La Société Guernesiaise. Special mention should be made of those who have served as Section Secretaries: David Falla (1972-85), David Le Conte (1985-93), Geoff Falla (1993-1997), Ken Staples (1998), Jessica Harris & Debby Quertier (1999-2006), Debby Quertier (2007-10), and Frank Dowding(2011-present).

I am also aware that a number of Guernsey people have pursued degrees in the subject, and astronomical careers elsewhere. For example, **Professor Peter Sarre** (1952-) is a researcher in astrophysical chemistry and molecular astrophysics at the University of Nottingham, studying molecules and dust in interstellar clouds, nebulae, cool stars, circumstellar shells and comets. He is a Fellow of the Royal Astronomical Society and of the Royal Society of Chemistry. He has served as Chairman of the UK Southern African Large (10-metre class) Telescope Consortium, and as a member of the UK Infrared Telescope Board, as well as a number of other astrophysics and astrochemistry boards and working groups.

Mention must also be made of photographic chemist **Michael Maunder**, who, although not a Guernseyman, lives in Alderney. A renowned astronomical photographer and author, especially about eclipses, he is a Fellow of the Royal Astronomical Society and of the Royal Society of Chemistry, and sits on the Council of the British Astronomical Association.

My own astronomical interest goes back to an early awareness of the night sky, which developed in my teenage years into a special interest in celestial mechanics. While at the University of Edinburgh I had use of a 10-inch astrographic telescope at the Royal Observatory, and worked there for a while, satellite-tracking with a kinetheodolite. I spent a period at the University College of Wales in Aberystwyth, developing the timing system for a satellite-tracking camera. I then went to the USA to work for the Smithsonian Astrophysical Observatory under a NASA contract for optical tracking of spacecraft and astrophysical observation, using a high-speed (f/1, 20-inch aperture) Baker-Nunn Schmidt telescopic camera in Florida, Hawaii and Arizona, and a 500-megawatt laser ranging system, and being responsible for precise world-wide timing, based in Cambridge, Massachusetts. After some years as Executive Director of the Smithsonian Institution's Research Foundation in Washington DC, I became a Department Manager at Kitt Peak National Observatory in Arizona, administering its enormous solar telescope and special research projects. I was elected a Fellow of the Royal Astronomical Society in 1991.

Upon my return to Guernsey in 1978, I was pleased to learn that there was an active astronomical society here in the form of the Astronomy Section, and have enjoyed being a member ever since. The Section has an active membership; long may it continue!

This article has attempted to place on record the achievements of Guernsey-born astronomers, not only within the island but also nationally and internationally. If I had to identify those past Guernseymen, especially those of the 19th century, who have made the most outstanding contributions to astronomy, I think they must be: Warren De La Rue, Sir Peter Le Page Renouf and Samuel Elliott Hoskins. There may, however, well be others that I have missed, and I would be interested to hear of them.

David Le Conte

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[1] *The orientation of megalithic tombs in Guernsey: an astronomical connection?, plus Addendum, plus Further Observations, by David Le Conte (Report and Transactions, La Société Guernesiaise, Vol XXV Pt V, 2005; Vol XXVI Pt II, 2007; and Vol XXVI Pt III, 2008).*

[2] *Guernsey Fellows of the Royal Society, by Amanda Bennett and David Le Conte (Report and Transactions, La Société Guernesiaise, Vol XXVI Pt V, 2010). This paper also contains accounts of John MacCulloch, Samuel Elliott Hoskins and Warren De La Rue.*

[3] *The Principles of Physiological and Physical Science; comprehending the ends for which animated beings were created; and examination of the unnatural and artificial systems of philosophy which now prevail, by Richard Saumarez, Esq (London, 1812).*

[4] *Proof and Illustrations of the Attributes of God, from the Facts and Laws of the Physical Universe; being the Foundation of Natural and Revealed Religion, by John MacCulloch MD (London, 1837).*

[5] *The astronomical records of Samuel Elliott Hoskins, by David Le Conte (Sagittarius, January-March 2011).*

[6] *See, for example, Report and Transactions, La Société Guernesiaise, Vol XXVI Pt I, 2006; and The Antiquarian Astronomer, Issue 5, 2011.*

[7] *Report and Transactions, La Société Guernesiaise, Vol XXVI Pt I, 2006; and The Antiquarian Astronomer, Issue 4, 2008.*

[8] *The telegraphic transmission of Greenwich Time to Guernsey, by David Le Conte (La Société Guernesiaise Communiqué, No. 67, summer 2008); and A hundred years of Greenwich Time, by David Le Conte (Communiqué, No. 68, winter 2009).*

[9] *Mechanics Institute Lectures, by David Le Conte (Sagittarius, April-June 2007), and Adolphus Collenette, 1841-1922, by David Le Conte (Sagittarius, October-December 2007).*

Picture credits:
***John MacCulloch**: The Royal Society.*
***Samuel Elliott Hoskins:** The Priaulx Library.*
***Warren De La Rue:** Royal Astronomical Society.*
***Sir Peter Le Page Renouf:** Guernsey Museum and Art Gallery.*
***David Falla:** David Le Conte.*

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

European Southern Observatory's Half Century. During the fifty years since the beginning of the project, the European Southern Observatory in Chile has made many important discoveries. Since 2003 the HARPS planet searcher facility has discovered more than 150 exoplanets, a very large telescope of four 8 metre ones which can be used in combination is also available, and plans for the completion of a 39 metre segmented mirror telescope are now in progress. (Astronomy Now, October 2012)

Sir Bernard Lovell 1913-2012 - Pioneer of Radio Astronomy. A tribute to the life and work of one of the great pioneers of astronomy in the 20th century. Sir Bernard Lovell developed the world famous Jodrell Bank radio telescope, which was also able to track the first orbiting satellite, Russia's Sputnik 1, in 1957. The steerable telescope dish still plays a major role in deep space observations, and as part of radio telescope arrays across the UK and Europe. (Astronomy Now, October 2012)

Neil Armstrong - First man on the Moon. A look back at how Neil Armstrong, who died in August 2012, became the first man to set foot on the Moon, and who it is thought will probably be one of the only humans of the present era to be remembered into the distant future. (Astronomy Now, October 2012)

Supernovas - Energy of a Billion Suns. The most powerful explosions in the universe, supernovas are larger than our whole solar system, and found to have the energy of a billion suns. (All about Space - a new magazine focused largely on space research, October 2012)

Understanding Planet Earth. It is thought likely that our planet formed from a nebula of up to 10,000 stars, one of which exploded nearby as a supernova. There is evidence that during its early history the inner solar system's planets and moons suffered a long period of rock bombardment from space. (Astronomy, November 2012)

Visiting Britain's legendary Patrick Moore. Astronomy journalist Stuart Clark reports on a visit to Patrick Moore's home at Selsey, West Sussex, which holds decades of astronomical history, and the achievements of a life devoted to the subject of astronomy, as portrayed in his writings of a great many books and articles, and in his longest running TV series, the monthly "Sky at Night" since 1957. (Astronomy, November 2012)

Atmospheres and Weather. A set of articles focusing on the varied atmospheres and weather on planetary surfaces, depending on factors such as differential heating, the effects of heat from a planet's interior, and planetary rotation. Jupiter and Saturn have some of the most active conditions known, and there is growing interest in the atmospheres now being detected around planets of other stars. (Astronomy Now, November 2012)

The Effects of Zero G in Space. How does an astronaut's body react to the conditions of zero G in space, and what are the medical consequences of living in space. (Astronomy Now, November 2012)

Life's Chances on Saturn's Moons. Planets may not be the only locations for living organisms in our solar system. Moons of the planets may also be a possibility for some kind of life to exist, if gravitational or other causes of heating are present. Saturn's moons Titan and Enceladus have shown signs that there may be organic processes on the surface of these moons, or below their icy surfaces. (Sky and Telescope, December 2012)

Curiosity first days on Mars. The inside story of the Mars Rover's ambitious mission, with the descent and landing techniques being the most complex sequence ever planned. The distance of Mars also meant that transmissions were not practical, so the control procedure had to be completely automated. (Astronomy, Special Report, December 2012)

The Herschel Space Observatory. The European Space Agency's Herschel Space Observatory was launched in May 2009, and has accelerated the exploration of infrared radiation sources, using a wavelength range hardly used previously. Findings have included the identification of features involved in star formation, discovering stellar factories, and seeing further back in time. The telescope is also able to work with the Hubble Space Telescope to create more detailed images. (Astronomy, December 2012)

Jupiter at its Best. At present and during the first few weeks of 2013, Jupiter can be seen at its brightest and best. The planet, with its cloud belts of changing form and colour, and the varying appearance of the Great Red Spot, continue to be a source of interest for planetary observations, with some remaining uncertainty about the cause of these changes. (Astronomy Now, December 2012)

Another Great Comet? Two recently discovered long period comets are due to be visible in 2013. The first to appear will be comet Pan-STARRS, predicted to reach a magnitude of minus 1, like a bright star, during the spring. More eagerly awaited will be comet ISON, expected to become perhaps brighter than a full Moon at the end of November - if the predicted brightening of the comet comes up to expectations as it approaches its closest position to the Sun. (Astronomy Now, November 2012)

Cosmic Collisions. The cosmic microwave background is strong evidence for the 'big bang' at the beginning of the universe, but is our universe the only one? Cosmologists now theorize that our universe could be just one bubble in a 'multiverse', and that evidence of this formation process should still exist. (Sky and Telescope, December 2012)

Britain's next Space Missions. With the UK now a leader in low-cost space systems, and having recently formed its own Space Agency, there are plans for, participation in new space missions. These are planned to include Earth orbiting spacecraft, to study the atmospheres of the gas giant planets, the interaction between the solar wind and the Earth's magnetic surroundings, and a spacecraft to be placed into polar orbit around the Sun for the first time. (Astronomy Now, December 2012)

End Piece

Light, gravity and black holes

In April 2009 David Falla gave a very interesting talk to the Astronomy Section on light, gravity and black holes. It has now been published as a paper in *School Science Review* (September 2012, **94**(346), pp 59-65). David has kindly provided a copy which is available at the Observatory. It discusses the nature of light, mass, relativity, the formation of black holes, and the evidence for them. It is an excellent and thorough introduction to the subject, and is recommended reading.

Prison course

During the summer, I was approached about the possibility of giving an astronomy course at the Guernsey Prison, as several inmates had expressed an interest. I was happy to oblige, and ran the course over a period of six weeks in August and September. For most of the year the Prison provides vocational and other courses leading to a qualification through the College of Further Education, but during the summer it offers non-vocational courses using volunteer tutors. I based it on our annual WEA course, and used a lot of the same PowerPoint presentations, although somewhat condensed because the time available was less. Frank Dowding conducted two of the sessions about the solar system, and I am grateful for his assistance. The participants were attentive, interested, and full of quite challenging questions. Already there has been interest in running it again.

David Le Conte

Spring Star Festival in Sark

To celebrate Sark's 2nd anniversary of their Dark Sky Island/Community status, a spring Star Festival is being held over the weekend 12th - 14th April organised by Sark Astronomy Society (SAstroS).

There are 3 visiting astronomers: Marek Kukula (Public Astronomer, Greenwich Royal Observatory) is returning for a third time, Dr Chris Lintott (presenter, Sky at Night) for a first visit and Steve (Darkskyman) Owens will be hosting a dinner at Stock's Hotel and guided star walks on Saturday 13th April and there will be talks in the Hall from midday until 4pm. More details to follow.

Material for, and enquiries about Sagittarius should be sent to the Editor

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