

Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise
April – June 2011

Forthcoming Events

Public Open Evenings

(now Thursdays)

26th May 2011: 9.00 pm

New format will be that Public Open Evenings will be on a Thursday evening and will comprise a talk or film show, with a clear night for observation being a bonus!

**Total Lunar Eclipse
15th June 2011**

View of eastern horizon required since Moon in shadow before it rises at 21.13 pm. Totality ends at 22.03 pm (when the Moon's altitude is 5°), and the Moon finally leaves the umbra at 23.02 pm (altitude 11°) and leaves penumbra at midnight.

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

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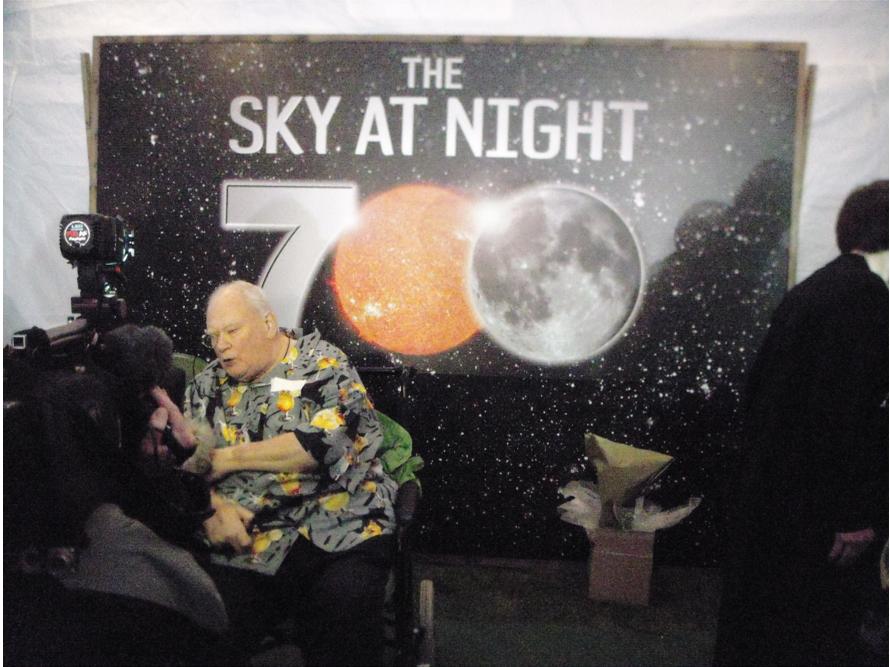
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Inserts

Star chart

Sunset, sunrise, moonset and moonrise times

700 and 88 not out!



BBC filming Sir Patrick Moore at his 88th birthday party.

On the 4th March 2011 Sir Patrick Moore turned 88, and I was reminded that when he first visited us, in 1993, he had just celebrated his 70th birthday, and we presented him with a specially knitted Guernsey.

The day after his 88th birthday he held a special party which also marked the 700th edition of *Sky at Night*, the longest running television programme in the world, which was to be broadcast the next day, 6th March. I was pleased to receive an invitation to this event, and, as I had been unable to

go to a similar one held a few years ago, I decided to attend.

As expected, it was a popular event, with what I estimated to be about 250 people crammed into a marquee in his Selsey garden. The party-goers were an eclectic mix of professional and amateur astronomers, celebrities and ordinary people whom Patrick had typically befriended and encouraged in their astronomical pursuits.

The professionals included people who had appeared on *Sky at Night*, such as: Peter Cattermole, Chris

Lintott, Iain Nicolson, and Colin Pillinger. Several BAA Council members were there, including David Arditti and our friend Mike Maunder, and Gilbert Satterthwaite (formerly of the Royal Greenwich Observatory and now Chairman of the Society for the History of Astronomy). Celebrities included author Terry Pratchett, comedian Jon Culshaw (who does a convincing impression of Patrick), and Queen guitarist and astrophysicist Brian May.

I had pleasant chats with a number of people, including Brian May, who has a particular interest in stereoscopic photography. We talked about Warren De La Rue's very clever stereoscopic photographs of the Moon, taken around 1858, and using lunar libration to produce a beautiful three-dimensional view. I have an original slide, and it turns out that Brian May has a set of original De La Rue stereoscopic prints. We have since exchanged notes about these pictures. By coincidence, my long-awaited article about Warren De La Rue's life, including a description of his stereoscopic photographs, happened to be published on the day of the party. (I say 'long-awaited' because there had been a two-year delay in publication of the issue of *The Antiquarian Astronomer*, in which it

appears.) I am now studying Brian May's collection, which includes records of exactly when each picture was taken, so further details may well emerge.

Patrick himself is now virtually confined to his home, being in very poor health, and under constant care. He was seated in a wheelchair, as if on a throne, at one end of the marquee, in front of a massive board commemorating the 700th *Sky at Night* and which was used in the programme. An effusive tribute to him was made by the Producer. The BBC was very much in evidence at the party, filming in preparation for the edition of *Sky at Night* to be broadcast in early April, and available on the BBC's iPlayer.

He received a procession of people, paying homage and bearing gifts. I had the opportunity to have a couple of chats with him, and presented him with a bottle of my home-made sloe brandy. I assured him that we remembered his visits to Guernsey with fondness and gratitude, and he expressed sadness at no longer being able to pay us a visit.

David Le Conte

Sark - An Official Dark Sky Island.

Following on from the International Year of Astronomy in 2009 (which marked four hundred years since the first telescopes were invented) and the increasing interest in astronomy, an article was published in the Guardian newspaper. This highlighted the news that Scotland's Galloway Forest Park had received recognition with an award for the clarity of its night skies, and was the first official dark sky area in the UK. It was announced that other areas of Scotland, The Peak District and Exmoor National Parks were also seeking to obtain similar recognition.

It is known that in our own local area, Sark also has a good dark sky, without much in the way of night time illumination which reduces seeing conditions for those interested in viewing the stars and planets around us. Sark resident Felicity Belfield, a member of the Guernsey Astronomy Section for many years, sent a copy of the Guardian article to Sark's Chief Pleas with letters to Conseillers, suggesting that the island with its good accommodation for visitors could benefit if it received official recognition as a dark sky island.

The suggestion was taken up and progressed with support in Chief

Pleas. On behalf of the International Dark-Sky Association, professional science co-ordinator Steve Owens visited the island to carry out a survey, so that any problem areas caused by bright lighting could be identified. Only a few such areas were noted, with owners readily agreeing to alter lighting fixtures as recommended.

The International Dark-Sky Association officially recognized Sark as the world's first Dark-Sky Island early in 2011, as announced locally on February 1st. Congratulations for this success are largely due to the initial efforts of Mrs Belfield for suggesting the idea of dark sky status for Sark, and to Chief Pleas Conseiller Jo Birch for supporting this proposal.

Royal Astronomical Society President, Roger Davies, also welcomed the news as a great achievement for Sark. Apart from local and national publicity, the story of the island's recognition by the International Dark-Sky Association also made headline news in several other European countries.

Geoff Falla

Pluto - Another Kind of Planet.

At a meeting of the International Astronomical Union (IAU) in 2006, astronomers decided that in view of recent discoveries, Pluto should be downgraded in status from a major planet to a new category of “dwarf planet”. This decision, however, together with revised definitions of a planet, which were also agreed, have caused some disagreement and comment amongst astronomers and with members of the public now questioning whether Pluto is still a planet.

As anyone with a serious interest in astronomy will know, Pluto was discovered in 1930 by the astronomer Clyde Tombaugh. At the time of this discovery it was thought that Pluto would perhaps be the last substantial planet to be found in the main outer region of the solar system, near or not far beyond the orbit of Neptune.

In more recent years, however, with the introduction of much larger telescopes including the Hubble Space Telescope, other small planets have been found in this outer region. One of these, discovered in the Kuiper Belt beyond Neptune has been named Eris. More importantly, it was found to be rather larger than Pluto, causing concern about how this would affect the classification of planets in the solar system.

For this reason, and considering the fact that Pluto is smaller than other planets, it was decided by the IAU that

the classification of Pluto as one of the nine major planets should be reconsidered, together with the definitions of a planet for reference in considering further discoveries.

It was agreed at the meeting that apart from changing the classification of Pluto to a new dwarf planet category, qualifications for a planet should be defined in several ways.

The first of these was that a planet should be defined as an object in orbit around the Sun.

It was further agreed that a planet should be an object which gravity has transformed into a sphere, and lastly that it should have cleared out its orbit of smaller bodies.

These revised definitions of a planet have been questioned for several reasons. Firstly, and perhaps most important, it has been pointed out that to define a planet as being in orbit around the Sun does not look beyond the limits of our own solar system, and disregards the fact that evidence has already been found for the existence of numerous planets in orbit around other stars. These planets have been referred to as extrasolar planets or 'exoplanets'. The dictionary definition of a planet is well established, and is found to describe a planet as a body that is in orbit around the Sun or other star, and that is seen by reflected light. This definition seems quite adequate, and supports the definition of Pluto as

a planet, also accepting the existence of other planetary systems - even before evidence for the first proper planet orbiting another star was discovered in 1995, in the constellation of Pegasus.

The second part of the definition, that a planet must have been transformed by gravity into a sphere can also be questioned. There is evidence of many collisions, with major impacts during the early history of our solar system. We are told that our Moon was formed in this way, when an object about the size of Mars collided with Earth, removing a large part of it as a result of the impact, and with much of this material then reassembling to form the Moon in orbit. For a while after this very major impact the Earth would not have been a complete sphere, so does this mean that Earth is not regarded as having been a planet during this period, until such time as it regained its "proper" shape as a sphere?

Lastly, as a very reasonable and valid objection, it has been pointed out that under these definitions for a planet to have also cleared out its orbit of smaller bodies, it seems that even Jupiter does not properly qualify, because there are many asteroids known as Trojan Asteroids at the Lagrange points of neutral gravity about 60 degrees ahead of and behind Jupiter in its orbit.

At the meeting which discussed Pluto, a committee appointed by the IAU itself had already recommended unanimously that the existing status of

Pluto should be retained. Not only that - but that Ceres, the largest asteroid in the main asteroid belt, should also be given planetary status - together with Pluto's largest moon Charon and the recently discovered Eris in the Kuiper Belt.

Pluto is seen as already meeting the definitions of a planet as agreed, but Pluto has a more elliptical orbit, making it different when compared with other planets. It was reported that when the vote on Pluto came, overturning the committee recommendation and towards the end of the meeting, many astronomers had already left, so that the vote to change Pluto's classification, downgrading it to the status of a dwarf planet was perhaps more of a minority decision than it would have been otherwise, or if a wider vote had been taken amongst astronomers in general.

Planets do, in fact, come in many sizes. Under the presently adopted decision the main part of the solar system consists of four inner planets - the rocky or "terrestrial planets" including Earth, and the four outer gas giant planets. Between the inner and outer planets there is the Asteroid Belt, including what have always been known also as minor planets, and with additional discoveries of these being added to a minor planet catalogue.

Some astronomers say that dwarf planets are not planets, intending perhaps to reserve the word planet only for the main planets of the solar system, but at the same time causing some of the present misunderstanding.

Another consideration, however, is that there are also dwarf stars and dwarf galaxies. The closest star to our Sun is Proxima Centauri, and this is a red dwarf star just over four light years away. Would any astronomers maintain that a dwarf star is not a star? Just as there are different kinds of stars and galaxies, there are also planets of different kinds.

At present, the new category of Dwarf Planet, as decided, consists of Pluto and its largest moon Charon, and Ceres - by far the most important object in the Asteroid Belt; in addition there is Eris (which was previously named Xena unofficially when discovered) and further discoveries, named Makemake and Haumea, also found in the Kuiper Belt - a wide band of outer asteroids and other material beyond the orbit of Neptune, where shorter period comets also originate.

Many astronomers and societies in Britain and overseas, particularly in North America, do not approve of Pluto's status as a planet being changed, as this is also seen as going back on what has been established and accepted for very many years.

Pluto is, if anything, rather more important than it was previously

because its moon Charon is officially upgraded, and being classified instead as a dwarf planet, together with Pluto.

Although the status of Pluto is perhaps of no great importance in the context of astronomy in general, the perception of the subject is important. There is much public interest in the solar system with all of its planets and moons, but there is continuing confusion at present regarding Pluto. Astronomy magazines still list Pluto with the major planets, separate from the new category of dwarf planets. Members of the public continue asking whether Pluto is a planet - and of course it should be regarded as such, however it is described, whether as just a small planet or as presently decided, 'a "dwarf planet"'

Geoff Falla

References:

The Canopus Encyclopedia of Astronomy.
(Canopus Publishing, 2004)

Planet Definition - Collins English Dictionary.
(Wm Collins & Co, 1981)

Sky and Telescope (November 2006)
Astronomy (October 2010)

Exam Questions and Answers
(from “*F in exams*”, by Richard Benson)

Explain the word ‘momentum’.

A brief moment

What was Isaac Newton famous for?

He invented gravity.

Is the moon or the sun more important?

The moon gives us light at night when we need it. The sun only provides light in the day when we don't. Therefore the moon is more important.

Currently the Sun is in a stable period. State two balanced forces in the Sun.

Page 3 and the footie page 5.

When a star's life cycle is over there is a possibility that it will become a black hole. Describe a ‘black hole’.

Something very dark in the ground and it looks like this.



Describe what happened during the ‘big bang’.

A lot of noise.

List three types of electromagnetic wave.

Tidal wave, shock wave, Mexican wave.

What is the name of the theory which suggests that the universe began from a very small point?

The year dot theory.

What is our galaxy called?

Galaxy Caramel.

How does the moon remain in a virtually circular orbit around the earth?

God only knows.

Describe the chemical differences between H₂O and CO₂.

H₂O is hot water, CO₂ is cold water.

Explain a religious theory for the existence of the world.

The big bang was God dropping something.

Contributed by David Le Conte

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

Solar System Spaceprobes - The Next Decade. There will be an ambitious programme of robotic spacecraft missions to the planets in the next decade, with return flights planned, including unmanned Moon missions. Most of the present and planned spacecraft are American ones, but there are also important European and Russian projects, with India and China also taking part. (Astronomy, January 2011)

Stephen's Quintet - a Shocking Surprise. The five galaxies of the Quintet group are a favourite for deep-sky observing, but one of the galaxies moving through the centre of the group has caused a giant shock wave and a surprising level of radiation which is still being investigated. (Astronomy, January 2011)

The Phantom Planet. A summary of discoveries in the Gliese 581 system, where six planets have now been identified in orbit around a red dwarf star. Two teams of planet hunters have been involved in the discoveries, but vibrational effects within the star have affected results, and have cast doubts on the claim that one of the planets is within the star's 'habitable zone' and may be Earth-like. (Astronomy Now, January 2011)

The planet Uranus - Voyager Anniversary. A set of articles

focusing on the 25th anniversary of the Voyager spacecraft fly-by of the planet in 1986, and how this planet was discovered by the British astronomer William Herschel in 1781. The outer planets are now seen as more important because of similar giant planet discoveries around other stars. Much still remains unknown, including the reason for the planet's extreme tilted angle and how its magnetic field is produced, which may be resolved by further planned missions. (Astronomy Now, January 2011)

The Youngest Nearby Black Hole. Evidence of a black hole just 30 years old has been found in the galaxy M100, by astronomers using the NASA Chandra X-ray Observatory, giving a unique opportunity to see how this kind of object develops. (Astronomy and Space, January 2011)

Galaxy Shapes, Interaction and Evolution. From classifying different galaxy shapes, astronomers have moved on to a better understanding of what forces determine a galaxy's shape. Wide field surveys of the galaxy population, and more focused observations by the orbiting Chandra X-ray Observatory and the Spitzer Space Telescope have greatly expanded the study of galaxies, their interactions and evolution. (Astronomy, February 2011.)

Captured Moons of the Giant Planets. The outer planets have a large number of moons, but it is now known that most of these did not form with their planets. It is thought that the

capture of moons must have started during the early history of the solar system, and recent studies suggest the probability of some common origin with captures from the Kuiper Belt Objects. (Astronomy, February 2011)

Spacecraft Fly-by of Comet Hartley.

In November 2010, the Deep Impact Extended Investigation mission achieved a close approach to the core of Comet Hartley 2, obtaining images of the unusual dumbbell-like shape and its very active jets. These were found to be produced by solar heating of frozen sub-surface carbon dioxide. (Astronomy Now, February 2011)

Secrets beneath the Moon's Surface.

It is now largely accepted that the Moon was formed as a result of a Mars-sized object colliding with Earth at an early stage not long after its formation. The surface of the Moon, including its far side unseen from Earth, is now known in detail, and some of the interior structure can also be determined. Analysis of surface materials has shown that the Moon has more water than previously thought, and it seems that volcanic activity continued for much of its past history. Evidence of cooling and contraction produced considerable seismic activity, until the recording equipment was switched off after the conclusion of the Apollo landing missions. (Astronomy, March 2011)

The Crab Nebula. The supernova of A.D. 1054, now known as the Crab Nebula is still being studied. As telescopes and other equipment have improved, astronomers have learned

much more about this steadily expanding nebula, but there is much in its unusual structure and behaviour that is not yet fully understood. (Astronomy, March 2011)

The Astronomer Edward Barnard.

The life of American astronomer Edward E. Barnard, and his discoveries during the late 19th century, including more than a dozen comets and Jupiter's fifth moon, now known as Amalthea. He also made observations of stellar occultations and a catalogue of dark nebulae. His achievements as an amateur also advanced the art of astrophotography, identifying the fastest moving of the nearby stars in our galaxy, now named Barnard's Star. (Astronomy, March 2011)

NASA's Mercury Orbit mission.

NASA's Messenger spacecraft has already made three fly-bys of Mercury, in 2008 and 2009, slowing the spacecraft down in preparation for the first orbital mission, due to begin in March 2011. Images including much of the surface were obtained from earlier fly-bys, but far more information is expected to be obtained, including mapping of the polar areas when the extended orbital survey begins. (Astronomy Now, March 2011)

Comets in Disguise. Several asteroids from the main Asteroid Belt between Mars and Jupiter have been found to be giving off material as they come to perihelion. It now seems that these are comets, which have been thought until now to come from more distant

sources, in the Kuiper Belt beyond Neptune, or in the much more distant Oort Cloud at the edge of the solar system. (Sky at Night, March 2011)

Patrick Moore - First among Equals. A tribute by astronomy historian, Allan Chapman, to Patrick Moore, setting out his achievements and the growth of astronomy through his writing, lecturing and through television. Other astronomers have

made their mark on the subject in various ways, but it is Patrick Moore who has brought an interest in astronomy to the general public, particularly through television, now with the longest running TV series - The Sky at Night, televised monthly since 1957 and passing its 700th episode. (Sky at Night, March 2011, including Supplement Outline of the TV Series.)

Obituary **Len Shaw (1912 - 2010)**

I was sorry to hear of the death of Len Shaw on 23 November 2010, at the age of 98. The *Guernsey Press* carried a full-page obituary of him on 2 February 2011, recording his undoubted abilities and ingenuity in electronics, culminating in his development of a hygrometer, which, he once told me, was used in every aircraft as well as having numerous other applications. His company, Shaw's Moisture Meters, received a Queen's Award for Export, and he was awarded an Honorary Professorship by the Royal Institution.

The *Press* mentioned his interest in astronomy, and some of the longer-term members of the Astronomy Section may recall that in the 1980s he regularly used to let us use his 8-inch Celestron telescope. He kept it at his Fort George house, but used it mainly for looking at shipping in the Little Russel. For several months every winter he went to his house in Florida, where he had another 8-inch

Celestron, and he lent us his Guernsey telescope while he was away. We previously had use of a 6-inch Newtonian which we had on indefinite loan, but when its owner decided to retrieve it we were left without any sizeable instrument. So Len's telescope was very useful to us for several years, until we acquired our own 11-inch Celestron.

I remember Len as a very affable man, who spoke with a strong Yorkshire accent, always smiling, friendly and hospitable. He famously owned one of Renoir's Guernsey paintings, which was exhibited for a short period at the Guernsey Museum. He told me he went to the Museum soon afterwards, and the staff behind the desk said it was a shame he had not come the previous week as a Renoir had been on display. He said "I didn't like to tell them it was hanging on my dining room wall."

David Le Conte

BAA meeting in Jersey

The British Astronomical Association will be holding an out-of-town meeting in Jersey from Friday to Sunday, 2nd to 4th September 2011.

Full details are to be issued with the June issue of the *BAA Journal*, and should appear in the next issue of *Sagittarius*. Members of the Astronomy Section who wish to attend may do so by submitting a registration form and the appropriate small fee. The 'local' organiser is Mike Maunder.

I have been invited to give a talk on the Saturday afternoon, on the orientations of Channel Islands megalithic tombs.

David Le Conte



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