Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise

April – June 2008

Forthcoming Events

Public Open Evenings

15th April – 8.30 pm

13th May – 9.00 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

Public Open Evenings

Minutes of the Astronomy Section Annual Business Meeting

(held at the Observatory, Rue Lorier, St Peters on 22nd January 2008 at 8pm)

Present: Frank Sealy, Geoff Falla, Mark Mauger, Frank Dowding, Colin Spicer, David Le Conte and Debby Quertier

1. Apologies: Jessica Harris and Peter Langford.

2. Election of Officers
All existing officers were prepared to continue in their positions for the coming year.

3. Treasurers Report.
Peter Langford had previously circulated the annual accounts, which showed that the Section had about £3,000 in funds. Income had exceeded expenditure. The largest item of expenditure in 2007 was the purchase of a new computer.

4. Open Nights
Once the 2008 dates for Open Evenings had been finalised they would be mailed to the Tourist Board, local schools, libraries, local media and the education authority. Colour posters were not essential if these couldn't easily be produced.

The organisation of Open Nights was discussed. Power Point presentations could be set running in the main building in the same way that videos (eg one about Mars) had been used in the past. The creation of information displays was discussed and Debby Quertier would investigate. It was agreed that further discussion about Open Nights organisation would take place.

5. Repairs
It was agreed to replace the toilet door and that the Section would pay for this. Debby Quertier would ask her husband to do this, ideally before the start of the WEA course. The landlord has agreed to undertake roof repairs in the spring as there had been extensive leaking this winter. It may be necessary to purchase new bookcases as a result of the leaks.

The various items of rubbish, cardboard and various old computers and TV would be disposed of at the appropriate recycling depot.

6. Purchase of Equipment
It was agreed to purchase a new dehumidifier and David Le Conte would obtain one from B&Q. A new answer phone was required - cost to be investigated.

Additional eyepieces for the Meade had been discussed at previous business meetings and it was again agreed to purchase one or more. It was agreed to purchase a laser mount for the Meade so that a laser pointer could be used for alignment. David Le Conte would procure.

7. Website
La Société Guernesiaise had upgraded its website with all sections having a front page with a link to their own

website. It was pointed out that Sagittarius articles no longer appeared in the Astronomy Section website and an article by Geoff Falla had recently been referenced in the Guernsey Press.

Sagittarius could be distributed electronically, saving postage, in pdf format and this could easily be linked in the website. Colin Spicer would investigate.

8 Any Other Business

Frank Dowding stated we should expand on our knowledge of Astronomy within the Section and suggested that more talks were needed and offered to prepare a talk for April/May. He also felt that one or more research projects were needed to focus our activities and this was agreed by the meeting. David Le Conte reminded everyone to ensure that the observing log was kept up to date. Debby Quertier would prepare an observing programme.

The WEA Astronomy course would run from 7th February for 6 weeks. The existing course format would be used again.

Membership leaflets for the Section needed restocking.

The matter of the trees on the neighbouring land had been referred to La Société.

The Section had been asked to prepare a presentation after the Société AGM. This would be an illustrated history of the Section incorporating astronomical images taken by members. Frank Dowding has video footage of events over many years and a selection of these would be incorporated.

There being no other business The meeting closed at 10.00 pm.

Debby Quertier

Other Solar Systems

Towards the end of 2007, a significant announcement was made in the search for 'extrasolar planets' - those being found around stars far beyond our own solar system. It was confirmed that a system of five planets had been found, in orbit around a star not too many light years away. More importantly, the most recently discovered planet in this system is in orbit within the star's 'habitable zone', the first such discovery. Temperatures in that region would allow the presence of any surface water to be maintained, thereby bringing the possibility of favourable conditions for the development of life as we know it.

It was thought at one time that our solar system was probably a rare occurrence, that the existence of planets around other stars was very unlikely. The formation of planets, in the case of our Sun, was thought to have been caused perhaps by a passing star's gravitational effects, coming too close to the Sun and drawing out material which then formed into planets. However, because individual stars are so far apart, it now seems

improbable that another star would come close enough for this to happen. Instead, the preferred theory is that our system of orbiting planets could have been produced as the Sun formed, contracting and leaving behind rings of material which then evolved into planets, and the formation of moons in many cases.

The first evidence of planets beyond our solar system came in 1992, not from a normal star but with the study of radio wave pulses from a pulsar - the small, rapidly spinning remains of a star after a supernova explosion. Variations in the pulses indicated that there .were several planetary objects in orbit around the pulsar.

The announcement of the first definite evidence of a planet in orbit around a normal star came in 1995. About fifty light years away in the constellation of Pegasus, the star 51 Pegasi had been at first eliminated from the search for planets because it was classified as being of a type much older than our Sun. When it was then found that the classification was an error, and that the star was virtually identical to the Sun, astronomers working with the University of Geneva made further investigations and confirmed that the star had a slight and regular wobble effect, evidently caused by an unseen companion.

Because the stars are so far away, even the largest of present telescopes are unable to see the comparatively dim light reflected from any planet at such a distance. Valuable information can be obtained, however, by using a spectroscope to analyse light waves. The Doppler effect, more familiar to us when an approaching sound drops in pitch as it passes by, is used in astronomy when light waves are seen to be shifted towards the blue or red ends of the spectrum as an object comes closer to us or retreats. By measuring these small regular movements of a star, in the case of gravitational effects caused by a planet, astronomers can discover the mass and approximate orbit of the companion object. In the case of 51 Pegasi, analysis of the measurements indicated this first evidence of a planet orbiting another star, and that the object would have to be a large gas planet to produce the effects seen. The surprise was that the planet had a very short, close orbit of just four days. In comparison, our own gas planets are in the outer part of the solar system, with Jupiter and Saturn having orbits of many years.

By the end of 2002, the existence of more than a hundred extrasolar planets had been identified, with an increasing rate of discovery. Many stars are known to have more than one planet, identified from the more complex gravitational movements than would be caused by just a single planet. Large gas planets are the most easily identifiable ones, until larger telescopes and better techniques are available.

There is also now the possibility of identifying planets as they transit across a parent star. This method uses CCD images, measuring small changes in light intensity, and the

slight dip in star brightness during the transit. Of the stars with evidence of planets found so far, less than ten per cent of these planets have orbital planes allowing transits to be detected. In recent cases, however, the faint glow from a transiting planet has also made it possible for the first time to analyse the atmosphere from its light spectrum, and this is reported to include evidence of chemicals contributing to the building blocks of life. In December 2006, the French National Space Agency (CNES) launched its Corot space telescope to search for transiting planets, the first such telescope to be used in the hunt for extrasolar planets, or 'exoplanets' as they have also become known.

The search and success rate of significant discoveries accelerated in 2007. The first Earth-mass planet, having the lowest mass of all those so far found, was located in orbit around the star Gliese 581. This is one of the hundred closest stars, about twenty light years away in the constellation of Libra. Measurements obtained by the European Southern Observatory in Chile indicated that the planet is slightly larger than Earth, and may have a solid surface. The planet has a short period orbit of 13 days, but this seems to be partly within the habitable zone - because the star in this case is a relatively cool red dwarf, reducing the temperature on such a nearby planet.

The possibilities for the detection of life came closer in 2007, with an announcement from the USA that water vapour had been detected in an extrasolar planet's atmosphere. The NASA Spitzer space telescope identified water in the infrared signal from a planet as it passed close to the parent star.

Much of the success in identifying the existence of extrasolar planets has been achieved by a team led by Professor Geoff Marcy at the University of California, using the Lick Observatory near San Francisco. The team has been responsible for discovering evidence for most of the extrasolar planets so far known, which had reached a total of more than 250 by the end of 2007.

Another key astronomer in the search has been Dr Debra Fischer, of San Francisco State University, who was very much involved in the latest discoveries in the system of planets around the star 55 Cancri, working in collaboration with Professor Marcy, and also using the Keck telescope in Hawaii. The additional planet found in the now five planet system is the first one known to be keeping an orbit entirely within a star's habitable zone.

It has taken many years, however, to reach this point in tracking down a planetary system which is being described as a near twin to our own solar system. The first planet identified in orbit around this particular star was announced in 1996. Analysis of the measurements obtained detected another two planets in 2002, and another in 2004, before the announcement in November 2007 of yet another planet - this time in the habitable zone.

The outermost planet in the system has been identified as a gas giant, at a similar distance as Jupiter is in our own system, but several times larger. Three of the other planets are in close orbits around the star, while the habitable zone planet has an orbit of 260 days, and is located in a position similar to that of Venus in our system. The star 55 Cancri also has the importance of being Sun-like, slightly less luminous but of nearly the same age and mass, and is at a distance of 41 light years. The constellation of Cancer is one of the less obvious ones, but is found between Gemini and Leo, and with this particular star just visible to the naked eye.

Present technology, even using the largest telescopes with adaptive optics to steady the image corning through the atmosphere, and space telescopes, still do not allow any extrasolar planets to be seen directly by astronomers, so everything depends on the precise measurement of gravitational effects and what can be learned from that. The exception at present is the possibility of observing the effects of transiting planets.

Almost all of the planets found so far are of the gas giant type, which have the more easily detectable effects on the parent star. This also applies in the case of the five planet system, where the presence of at least one other planet is also suspected. It has been pointed out that our own gas giant Jupiter has many rocky type moons around it, and there is no reason to suppose that the same does not apply in the case of the extrasolar planets. A large gas planet orbiting within a star's habitable zone could have suitable conditions for life on any of that planet's moons.

Looking more into the future, more than 200 suitable Sun-like stars have already been identified for further studies. In examining these stars, any Earth-like planets identified will also be targeted by a new radio telescope to be built by the University of California, Berkeley, in conjunction with the SETI Institute - the Search for Extraterrestrial Intelligence, which has the aim of identifying intelligent signals.

Before long there should be more visible evidence of extrasolar planets. Much larger telescopes are to be built, and it is hoped that it will then be possible to begin observing some of the larger planets, and detecting more Earth-sized planets, which must be far more common than previously realized. The European Space Agency is due to launch a group of space telescopes, working together to produce far better images than anything which can be obtained at present. This will be using infrared technology in the search for life, and is the suitably named Darwin project, at present being planned.

Two of the essential components for the evolution of life are known to be water and oxygen. Apart from the recent identification of water vapour in an extrasolar planet's atmosphere, water has also been detected elsewhere in space - notably in the Orion nebula, where protoplanetary

discs have been observed, apparently in the process of formation. Oxygen is a product of plant life, and it seems that this component for life as we know it cannot be maintained in any atmosphere for an extended period of time - unless there is a source of regeneration.

When the presence of oxygen is detected in an extrasolar planet's atmosphere, it will be a good indication that life of some kind may exist there.

It will be impossible at present to consider visiting such planets at these great distances, even to the nearest stars, but it will be reassuring to know that other solar systems really do exist, and that extraterrestrial life may also be confirmed in the not too distant future.

Geoff Falla

A Visit to Jodrell Bank

Originating from Cheshire, Jodrell Bank is not far from my family's home in Cheadle Hulme and I have visited it several times over the years, both on school visits and later out of a growing interest in astronomy. As I was home at the beginning of September, my sister suggested we visit. I needed no persuasion and the two of us set off one wet Sunday morning with my dad and my sister's other half. It is a short journey and you usually need little in the way of signs as the Lovell Telescope soon becomes visible high above the trees in the Macclesfield countryside. Not so this time, the trees have obviously grown a little and a missed turning got us heading in the wrong direction!

Once we'd found the place, it looked at first, just as I'd remembered it. However on entering the building, hastily as it really was pouring, we found that many changes had taken place. There are major works and improvements going on over the next few years and no doubt the new facility will be something special. But for the present the planetarium had gone together with the extensive exhibitions. There had once been a life size Isaac Newton replica sitting in his study explaining his discoveries with a hologram face. It was really creepy because it somehow came across as very lifelike.

In its place there is an interim visitor centre with some video exhibitions, including one showing how Jodrell Bank was built and a tour around the working facility. There is a 3-D film show which takes you through the solar system and explains some basics on stellar formation. This was narrated by an Australian astronomer and you did notice that Orion was 'upside down' in the illustrations. This talk and video was very informative and well presented, made even better by the 3-D effects.

Outside things were pretty much as they always had been. You can walk around the impressive 250 feet Lovell

telescope and there are two much smaller dishes in the grounds. If the weather is reasonable you can see the telescope from the apron at Manchester airport as you board your Aurigny aircraft to Guernsey. It is clearly visible from the air if you sit on the left of the plane and take off with the apron to your right.

We got wet testing the 'whispering gallery', two dishes about 250 feet apart that bounce the sound to each other – you really can whisper to a person 250 feet away from you. This caused much amusement to young and old alike as various silly messages were relayed between the dishes. Also outside, there is an arboretum through which you can trace the nine planets (still with Pluto I believe) and on a fine day there are plenty of areas to picnic. (We declined this in favour of lunch in a cosy Cheshire pub!)

The Lovell telescope celebrated its 50th birthday in 2007, along with other notable astronomical landmarks such as 'The Sky at Night' in April and the launch of Sputnik in October. Today Jodrell Bank is the base for the MERLIN network of radio telescopes. It is involved in research into pulsars and the cosmic background radiation. Jodrell Bank is part of the Astrophysics Department of Manchester University. Sir Bernard Lovell was responsible for constructing the radio telescope which bears his name and the site itself was first used for astrophysics in December 1945.

Despite short term lack of facilities within the visitor centre, it remains a most interesting place to visit.

Debby Quertier

Three Ploughs in Guernsey

We are all aware of *The Plough* pub in Vauvert, which indeed was one of the targets of the astronomical treasure hunt organised so well by Ken Staples some years ago. I assume that the pub was named after the agricultural implement rather than its representation in the night sky.

There are, of course, many hostelries named "The Plough Inn" in the UK. A Google search of that phrase brought up nearly 90,000 hits, which does not, however, mean that that is the number of establishments with that name. Wickipedia says that some pub sign artists depict the plough as the seven stars of the asterism, and this leads to the name *The Seven Stars*.

The Seven Stars, of course, often refer to *The Seven Sisters* of the Pleiades star cluster, but they can equally mean the Plough.

That could well be the origin of *Sept Etoiles*, a short stretch of lane in the Vale, leading north off La Moye Road. It is just 60 metres long, and does not appear in Marie de Garis's *Glossary of Guernsey Place-Names* [1]. Our Observatory landlord and Guernsey historian Hugh Lenfestey tells me that he plans to include it in

his proposed tome on the origins of place names. While it requires further research, he thinks it must be of relatively modern origin – post-1890 – as it does not appear in old records. In the meantime, it appears probable that it refers to the Plough, to which the road would appear to be leading at some times of the year.

Finally, there is reference to the Plough in the name of the new special needs school Le Rondin. In the school's entrance is a large notice reading as follows:

The lights in the ceiling represent the constellation of Ursa Major or The Great Bear. The solid lines show the part of the constellation known as The Plough. The name Le Rondin was chosen to reflect the history of the site. The field on which the school and centre is built was called Le Rondin because it was ploughed in a circle.

David Le Conte

Reference:
La Société Guernesiaise *Report and Transactions 1976*, Volume XX, Part 1, pp 66-103.

Celestial Spoof

In common with most people, I receive many spam emails every day, and they all go straight into the deleted files folder. However, recently I received one which literally caught my eye. It was a picture taken by the Hubble Space Telescope. The sender (unidentified, of course) claimed:

"This photo is a very rare one, taken by NASA. This kind of event occurs once in 3000 years. This photo has done miracles in many lives. Make a wish ... you have looked at the eye of God. Surely you will see the changes in your life within 7 days. Whether you believe it or not, don't keep this mail with you. Pass this at least to 7 people. This is a picture NASA took with the Hubbell (sic) telescope called "The Eye of God." "

Before dumping it I took the trouble to reply, pointing out that it was in fact a picture of NGC 7293, the Helix Nebula in the constellation Aquarius, that NASA had not referred to it as the Eye of God, that it was easily visible in amateur telescopes, and that instead of misleading people with such idiotic nonsense he (or she) would be better to appreciate the wonderful things in the universe for what they really are.

What his (or her) reaction would have been to this reply I shall never know, because the Internet rejected it as undeliverable.

Anyway, any sleepless nights I have will be because I am looking at the wonderful things in the universe, not because of any guilty feelings about having broken this particular chain.

David Le Conte

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

The Lives of Stars. A set of articles, including the evolution of stars as illustrated by the Hertzsprung-Russell diagram, the many types of stars, how they are formed; also the comparatively short lives of massive stars, and information on some of the more extreme stars which also exist in our Galaxy. (Astronomy Now, January 2008)

Return to Mercury. Mercury was visited by the Mariner 10 spacecraft in 1974-1975, but this was only able to obtain images of less than half of its surface. This will be corrected when the Messenger spacecraft begins a flyby of the planet from mid January before being put into orbit, so that a full survey of its surface can be obtained. (Astronomy Now, January 2008)

The Search for Alien Earths. The search for planets beyond our solar system has so far resulted in the identification of more than 250 planets in orbit around other stars. These are mostly massive gas planets, but it is expected that more Earth-like planets will soon be found as the technology improves, and with the ability also to find planets in transit across their parent stars. (Sky and Telescope, January 2008)

Solar Eclipse 2008. The only total solar eclipse in 2008 has a path across Siberia and into China. Details of the eclipse observing prospects from the most favoured locations. (Sky and Telescope, January 2008)

Hipparcos- Star Distances Refined. The European Space Agency's Hipparcos mission, with data first released in 1997, measured the distances of more than 100,000 stars, and the cosmic distance scale out to the farthest galaxies. Recently released data reduces the level of uncertainty, with some surprises. (Sky and Telescope, January 2008)

The Centre of the Milky Way. The Black Hole that exists at the centre of our Milky Way Galaxy, in the area of Sagittarius A, and the mystery of apparently young stars which are orbiting close to the nucleus at high speed, with some stars being ejected from the centre in the process. (Astronomy, January 2008)

How Comets shaped History. Some of the unusual and great comets of the past, and how they have been marked in historical accounts dating back to ancient Greece and Roman times, to the Battle of Hastings and more modern appearances. (Astronomy, January 2008)

Mauna Kea Observatory. A review of the multi-national observatory site on the island of Hawaii, and some of the most important discoveries made there, using the optical and infrared telescopes - including the twin Keck optical telescopes, the world's largest. (Astronomy and Space, February 2008)

Gas Giant Planets. A set of articles focusing on the structure of gas giant planets such as Jupiter and Saturn, how these planets are formed, and the gas giants around other stars - which will help towards better understanding of our own solar system. (Astronomy Now, February 2008)

Europe takes its place in Space. Adding to the European Space Agency's existing missions, including those to Mars and Venus, the Columbus laboratory is to be added to the International Space Station and launched from the French Guiana Spaceport in February. The Ariane 5 rocket's lifting capacity is much greater than that of the Russian Progress vehicle used previously. (Astronomy and Space, March 2008)

Messenger at Mercury. NASA's Messenger spacecraft made a successful first flyby of Mercury in January. Images obtained have revealed a Moonlike surface, similar to the Earth-facing side, but with some intriguing features including a crater surrounded by a system of extensive radial grooves not seen before. (Astronomy Now, March 2008)

The Sun Reactivated. The new Solar Cycle 24 began in early January with the first sunspot recorded in the north mid-latitude region. Much is already known about the Sun, but some processes remain uncertain including the cause of the average 11 year solar cycle of activity. (Astronomy Now, March 2008)

The Elements of Life. At the beginning of the universe after the 'Big Bang', it is accepted that only the lighter elements existed, predominantly hydrogen and helium. An explanation of stellar evolution processes, and how these were necessary in forming the heavier elements essential for life. (Sky and Telescope, March 2008)

Ultrahigh-Energy Cosmic Rays. Some cosmic rays originate from solar flares, others from supernova remnants. It now seems that the remainder, in the form of ultrahigh-energy cosmic rays from precise directions, may originate from the nucleus of active galaxies - some particles taking just minutes of travel to reach Earth. (Sky and Telescope, March 2008)

All about Galaxies. A special issue on the subject of galaxies, including how galaxies evolve into their present form, what happens when galaxies collide, evidence that our own Milky Way has absorbed dwarf galaxies, and 'starburst galaxies' such as M 82 - which have much more frequent supernova events. (Astronomy, March 2008)

Cynosure

In his poem 'L'Allegro', written in 1645, John Milton wrote the lines:

"Where perhaps some beauty lies, The cynosure of neighbouring eyes."

The word "cynosure" is now seldom used. One dictionary defines it as: "a person or thing that is the centre of attention or admiration", another as "the focus of attention, the centre of attraction, something which acts as a guide."

Its origin, however, is of interest to astronomers. It derives from the Latin word *cynosure*, which in turn is from the Greek *kunosoura* . And that word is derived from two words: *kuon*, meaning *dog*, and *oura* meaning tail. So the word means the *dog's tail*.

It originally referred to the constellation Ursa Minor, and particularly the pole star, which is, of course, of special importance to sailors. Hence, "the centre of attention" or "guiding star". Indeed, the OED gives its literal astronomical meaning as the primary one, when the word first came into use in the late 16th century.

So, perhaps we should make greater employment of this useful word.

References:

The Oxford Dictionary of Quotations.
The New Oxford Dictionary of English.
Chambers 21st Century Dictionary.
The Oxford English Dictionary.

David Le Conte

Astronomy Section Officers

Secretary	Debby Quertier	725760
Hon Treasurer	Peter Langford	263066
Editor	Colin Spicer	721997
Facilities	Geoff Falla	724101
Public Relations	David Le Conte	264847
Library		724101
Research	Geoff Falla	255215
Light Pollution	Frank Dowding	
	Vacant	

Observatory

Rue du Lorier, St Peters,
Guernsey
Tel: 264252

Web page

www.astronomy.org.gg

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

Colin Spicer
60 Mount Durand, St Peter Port
Guernsey GY1 1DX
Tel: 01481 721997
colin.spicer@cwgsy.net

Copy deadline for next issue is 27th June 2008

La Société Guernesiaise, Candie Gardens, St Peter Port, Guernsey GY1 1UG.
Tel: 725093