Beginners' Guide to the Winter Sky

On 26th November we are holding an evening aimed at those members who are not necessarily familiar with the night sky and who would like a back-to-basics introduction. Come along and find out what is up there. If you have binoculars bring them along.

A note from David Le Conte

On the evening I observed the close-approach asteroid (see article page 2) I was, perhaps surprisingly, the only person at the Observatory, despite the wide interest of the event. I feel sure that I cannot have been the only Section member interested in seeing it. If anyone wishes to join in observing any such unusual astronomical events they can easily telephone the Observatory to see if someone is there, or better still make advance arrangements to meet up. More members should also learn to use the telescopes so that they know how to locate objects independently. Last year I prepared a comprehensive and easy to use manual, and training is always available for any interested member.

Christmas Meal

In a break with tradition this year instead of a shared supper at the Observatory we are planning to have a bar meal at the Hougue Fouque on 10th December. Everyone is welcome but in order to have an idea of numbers please contact Debby Quertier by 3rd December.

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Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiase

October - Dec 2002

Forthcoming events

Observatory Open Days
Tuesday 15th October and Tuesday 12th November at 8pm

Beginners' Guide to the Winter Sky
Tuesday 26th November at 8pm

Christmas Meal
Tuesday 10th December at the Hougue Fouque

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

Inside

Centre inserts

Star chart
Sunset, sunrise, moonset and moonrise times

Section News

*by **Debby Quertier***

Visitors
We continued to be fairly busy with visitors over the summer months, even on cloudy evenings there were a few visitors. Despite the absence of visible planets we have been able to show our visitors nebulae, galaxies, double stars and the many objects that can be found with just a pair of binoculars. Although we had decided earlier that we would not open every week, the weeks that we chose (which did include all the school summer holidays) were very well attended and as a result our funds have been boosted by a worthwhile amount.

Summer Barbecue
Our barbecue and Perseid meteor count was planned for the night of Monday 12th August 2002. The Moon was favourable and the weather was glorious. The evening did not get off to the best of starts though as we arrived to find that we did not have the actual barbecues. Fortunately a couple of us had packs of disposable ones and, after a quick trip back home to pick them up, it was all systems go. The evening was well attended and once we had all eaten too much we settled down to enjoy the meteors. The sky was wonderful. The Milky Way was clearly visible overhead and M31 was quite easy to pick out. (I know that M31 is the most distant object visible to the naked eye but I never find it that easy to spot without binoculars). We had enjoyed watching the stars come out one by one and from about 10pm onwards we started to spot the meteors. We officially counted 41 Perseids in the hour from 10.20pm to 11.20pm, some being very bright. We also reckoned that, for every meteor we saw, we also saw a man-made satellite. The evening was a great success, despite the earlier mishap over the barbecues - which now seems very funny, and those who attended enjoyed themselves.

Radio Appearances
We have appeared on the Radio recently to talk about the Perseids and astronomy in general. This is quite enjoyable to do and it does help to publicise our Observatory.

Professor Runcorn's Books
We still have several boxes of the journals left to us by Professor Runcorn. Recently the RAS has made contact with us and we hope that the journals will be sent off to their final destination in the not too distant future.

A Close Approach

***David Le Conte** witnesses a once-in-a-lifetime event*

On the night of 17/18 August 2002 an asteroid named 2002 NY40 made a close approach to Earth. "Close" is, of course, relative. At over half a million kilometres it was still further than the Moon. Although only half a kilometre wide the predictions were that it would easily be visible in small telescopes, being about 10th magnitude. The closest approach was scheduled to be after sunrise on the 18th, but I went to the Observatory after sunset on the 17th, reckoning that, being high in the sky, it should be visible then, despite a first quarter Moon, and taking advantage of a brief spell of perfectly clear skies.

I downloaded the asteroid's orbital elements from the Internet, and used computer software to determine its position and to slew the 16-inch Meade telescope to the predicted direction. I also used a convenient chart produced by *Sky and Telescope* magazine and published on the Internet. Even so, it took me about an hour and a half to locate and confirm the object in the field of view, using the 50mm eyepiece.

I had seen asteroids before, particularly Vesta, the brightest, but of course one can see no evident movement, only identifying them positively by their predicted location and their change in position over a period of hours or days, as they are typically at distances many times that of the Moon. 2002 NY40, however, was close enough to discern some movement, albeit slow - rather like watching the minute hand of a clock. This motion was more evident when the asteroid passed close to a star. I had to watch, therefore, for some time before being certain that it was the object for which I was searching. It was also very easy to lose once one had lost sight of it, as I found out when I redirected the telescope temporarily towards Altair in order to focus my camera through the 5-inch Takahashi refractor, and then tried to find the asteroid again!

News reports had suggested that the asteroid might be visible in binoculars, but I cannot imagine that anyone could have identified it that way. For one thing, there are lots of 10th magnitude stars (even in the half-degree field of view of the telescope, let alone the 7-degree field of binoculars), and the motion was so slight that reasonable magnification was needed to discern it - far beyond the capabilities of binoculars.

It was nonetheless fascinating to watch it move relentlessly through the constellation Sagitta, and I did not give up until 1:00 am (fortunately, because it became cloudy later and there was a shower of rain). After a lifetime of observing the heavens this was an entirely new and unexpected experience. The asteroid, looking just like a star (in conformity with the meaning of the term 'asteroid', ie 'star-like') took 7 or 8 minutes to cross the half-degree field of view.

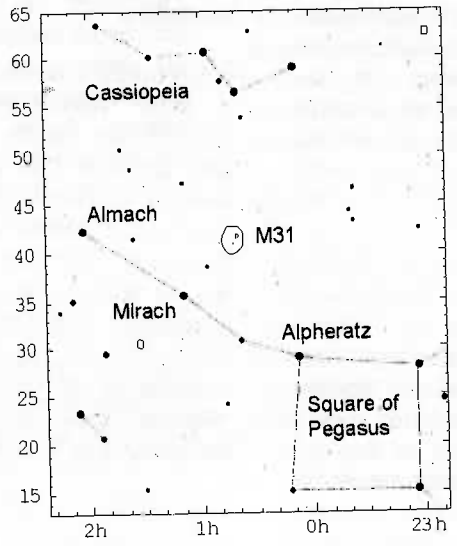
2002 NY40 has now vanished from sight, having moved too close to the direction of the Sun to be visible. It has been suggested that such events take place only once every 50 years or so, and I feel pleased to have witnessed one in my lifetime.

David Le Conte

The Constellation of Andromeda

by Geoff Falla

It is a sure sign that summer is drawing to an end, with the darker nights of autumn just around the corner, when the stars of Andromeda begin to rise above the eastern horizon. The daylight hours are shortening steadily and we do not have to wait until the late evenings for the stars to become visible, and any planets which may also be in view. By early evening in November the constellation of Andromeda is high in the sky, and is easy to find with the adjoining Square of Pegasus rising cornerways to an almost overhead position.



Alpha Andromeda, the star at the head of the constellation, is found at the northeast corner of the widely spaced stars forming the Square of Pegasus. The star is named Alpheratz, and was previously known as delta Pegasi, the fourth star in the square, until it was decided to transfer it to Andromeda. Including Alpheratz, it is easy to follow the curving line of four bright, evenly spaced stars towards the north, below the W shape of Cassiopeia. The most northerly star in this line, beyond the foot of Andromeda, is the leading star in the constellation Perseus.

The second bright star in the line is beta Andromeda, and is named Mirach. Just above this, two stars of lesser brightness lead us towards the most famous object in Andromeda, the Great Spiral Galaxy known as M 31. It is the most distant object visible to the naked eye, and can be seen as a hazy patch of light about 2.2 million light years away from us. The galaxy can be seen well in binoculars, appearing to be oval in shape because we are viewing it at an angle of about 15 degrees from the plane of the spiral. Only the bright, central part of the galaxy can be seen without a time exposure photograph which is able to bring out the fainter outer regions. Although the galaxy is recognized as being similar to our own galaxy in about 180,000 light years in diameter. The overall width extends to more than four degrees of the sky, almost ten times the diameter of the Full Moon. The galaxy is one of the largest, and has been known for well over a thousand years, long before the invention of the telescope. It appeared on ancient star charts, and was known in the past as 'the little cloud'.

Using a telescope, it is possible to distinguish that M 31 has two lesser companion galaxies. One looks star-like and is M 32, while a fainter elliptical galaxy is on the opposite side and is designated NGC 205. This object was known to the French astronomer Charles Messier, but for some reason was not included in his famous list of Messier objects. Both of these galaxies are in orbit around M 31. As with our own Milky Way galaxy, M 31 also has a large number of globular star clusters at its edge, each consisting of countless stars around a central more dense core. Even the most powerful telescopes are only able to identify individually the largest and brightest stars in the galaxy itself. Together with our own galaxy, M 31 is a member of the local group of galaxies which are gravitationally bound together, consisting of about 30 objects in total.

Moving on again northwards in Andromeda, the next bright star in the constellation is gamma, named Almach. This is one of the best double stars to be seen within the range of a small telescope. The brighter star of the pair is a golden yellow colour, while the companion star is greenish-blue. In 1842 it was discovered that the companion was itself a close double star, the secondary having an orbital period of 61 years according to more recent calculations. The separation is, however, very close, less than one arc second, and only visible in the more powerful telescopes. It was then found that one of the stars also had an even closer companion, which was only possible to identify spectroscopically, and with an orbit of less than three days, thereby making gamma Andromeda a quadruple system.

Another interesting object to be found in the constellation of Andromeda is a planetary nebula, NGC 7662, above the Square of Pegasus and more difficult to find, at co-ordinates Right Ascension 23 hours, 25.9 minutes and Declination + 42 degrees, 33 minutes. It is bluish- green, of about 9th magnitude brightness, with a glowing ring which is identifiable in larger telescopes. A planetary nebula, unlike an exploding nova star, is considered to be more long lived with evidence of the surrounding shells of glowing gas being maintained by a flow of material from the central star.

Being the most well known object in the Andromeda constellation, it is interesting to wonder how the great galaxy M 31 may have changed in two million years from what we are seeing at present. This is not too long a period in the evolution of a galaxy, but during that time there will no doubt have been many nova and supernova events as stars have come to the end of their lives in the galaxy, the burst of light from these incidents still to reach us at some time in the future. It is estimated that there are about 30 nova events in our own galaxy each year, with supernovae occurring much more

rarely, a few every thousand years. A supernova from the explosion of a giant star in the M 31 galaxy was observed in 1885 reaching magnitude 6 - as bright as many stars to be seen in our own galaxy.

Meanwhile, the great galaxy in Andromeda is approaching us at a steady rate, and may eventually be in collision with our galaxy. But there seems no need to worry. Even at an estimated closing speed of about 100,000 miles per hour, and being as it is the closest major galaxy to our own, it will be quite a few billion years before it is on our doorstep, so to speak, - such is the scale of the Universe.

Geoff Falla

Astronomy and Space - References for Further Reading *by Geoff Falla*

Mars - A Frozen Ocean Discovered. The Mars Odyssey spacecraft has found evidence of huge amounts of ice just below the surface of Mars. The discovery has taken scientists by surprise, and will make a manned mission much more likely. *Astronomy Now, July 2002*

Beyond the Big Bang. The Big Bang may not have been the beginning of the Universe but just one episode in a continuous cycle. The present inflation model of the Universe can, however, be tested. If this fails it is probable that the new cyclic Universe model will become the best theory of how the Universe really works. *Astronomy Now, July 2002*

Large Telescopes. Observatories are now planning to build larger telescopes, with mirrors up to 100 metres (4,000 inches) in diameter, in conjunction with the use of adaptive optics. *Astronomy Now, July, 2002*

Variable Stars. A set of articles explaining the different types of variable stars. Including a feature on eclipsing binaries, and red giant stars - many of which are also variables. *Astronomy Now, July 2002*

Spaceguard Survey. An update on the search for near Earth asteroids, with the aim of discovering 90 per cent of these objects within the next six years. Also details of the discoveries during 2001. *Astronomy and Space, July 2002*

The Constellation Hercules. A detailed description of this constellation which contains the famous M 13 star cluster, and the less well known but also impressive cluster M 92. *Astronomy and Space, July 2002*

Free-Floating Planets. objects which are too small to be stars have been found 'free floating' in space, in the Orion Nebula. Should mass or origin be the deciding factor in labelling such objects planets? *Sky and Telescope, August 2002*

Towards a Definition for a Planet. The International Astronomical Union still has no standard definition for a planet. The recent proposal that Pluto should be demoted to a minor planet - the same as the asteroids, has brought about efforts to define a planet. *Sky and Telescope, August 2002*

Hubble's New Vistas - Galaxies in Collision. New images from the Hubble Space Telescope reveal galaxies colliding and passing close to each other - the Tadpole galaxy in Draco, and galaxies nicknamed 'The Mice' in the Coma cluster of galaxies. *Astronomy, August 2002*

The Habitable Zone. The region around a star where any planet has just the right temperature for water to exist in liquid form - seen as an essential for the development of life. A more recent concept is the Galactic Habitable Zone. Conditions for habitable planets appear to be more favourable in the inner regions of galaxies. *Astronomy, August 2002*

Hunting Exoplanets. In June it was announced that more than 20 new planets have been discovered around other stars, bringing the total to about 100 since the first was found in 1995. A set of articles describe the history of the hunt for these 'exoplanets', with details of current and future detection methods. *Astronomy Now, August 2002*

The Search for Vulcanoids. It is thought that there may be asteroids in orbit near the Sun. It was once claimed that a small planet, named Vulcan, had been identified inside the orbit of Mercury. To find any such objects, a technique of shadow tracking is to be tried using an airborne camera. *Astronomy Now, August 2002*

Earth and Moon - Mutual Attraction. An explanation of the interaction of the Earth and the Moon, in particular in relation to the tidal effects. *Astronomy Now, August 2002*

Black Hole Theory confirmed. The Chandra X-ray telescope has identified flares produced by the interaction of material with a black hole's magnetic field. *Astronomy Now, September 2002*

Full Speed to Mars. Next summer the Mars Express European spacecraft is due to be sent to Mars to answer outstanding questions about water on the planet and whether there was, or still is, life there. *Astronomy Now, September 2002*

Vega - Jewel of the Summer Sky. The brightest star in the summer sky, Vega was once the pole star and has been found to have a disc of material around it which may contain planets. Also, why this star has been important in astronomy. *Astronomy Now, September 2002*

Beyond Cosmos. It was in 1980 that Carl Sagan presented his landmark TV series 'Cosmos' on astronomy and space exploration. Much more has been discovered in the last 20 years. *Astronomy, September 2002*

The Drake Equation. It was back in 1961 that Frank Drake of Cornell University developed an equation to calculate the possible number of civilisations which may exist in our galaxy. Some of the variable factors are becoming more clearly defined, as with the discovery of planets around other stars. The ongoing search for evidence of extraterrestrial intelligence. *Astronomy, September 2002*

The Norwich Astronomical Society

*When **Mark Humphrys** moved to Norfolk he joined the Norwich Astronomical Society and became editor of its newsletter 'Cygnus'. Here he tells us about the Society.*

The Society has been around for over 57 years, being founded in 1945. For most of its existence it has been based in a small field in a place called Colney Lane on the outskirts of Norwich. However, in the early nineties plans were first put together by the local government to site a new hospital in the field and surrounding area. An action committee was formed to fight the proposals and after many months of campaigning the Health Authority agreed to fund a new site for the society.

A site was found on the edge of a small airfield at Seething, about 8 miles south of Norwich. The Health Authority purchased the two and a half acre site for the Society, built a new clubhouse and arranged for the transportation and rebuilding of all the Society's equipment – including the massive 7 metre dome housing the 30" telescope. John Mason officially opened the site in the mid nineties.

By 1999 the 30" telescope was found to be needing major renovation and it was decided to dismantle it and modify the dome to be more user friendly and equip it with a modern computer controlled telescope – a 12" Meade LX200. It was thought that fund raising would take around 2 years or more, but a great deal of effort by the members, driven by the Chairman Mark Lawrik-Thompson and his wife Helen, managed to raise the £15,000 in only 8 months. Fund raising events took all forms, from a "Natural World Exhibition" in an exhibition hall in the centre of Norwich with stands and exhibits provided by the Royal Society for the Protection of Birds, local conservation groups, a local camera shop and several other organisations. To a "Fly and B-B-Q" – Mark, a qualified pilot, chartered a light aircraft for the day and members were treated to a flight over the countryside around the Observatory, taking off from the nearby airfield followed by a B-B-Q afterwards.

The large dome and the 30" 'scope were dismantled and given to the Breckland Astronomical Society who are hoping to restore it. Then the existing foundations were modified to take the new dome and telescope. All the design work was carried out by members of the Society. Much of the materials, concrete etc were donated by local companies. The labour was provided by members. The new dome was opened in September 2001.

There is a smaller dome on the site, which used to house a 10" Newtonian, the optics of which were made by a club member over 50 years ago. Though excellent in quality the design of the telescope is perhaps not the best when it comes to giving views of the night sky to visitors, so it was decided by the Society to replace the 10" with a high quality refractor. Fund raising is now in progress and it is hoped to have the new 'scope in place for the winter season of public open nights starting in September.

The open nights have proved to be very popular. A club member will give an illustrated talk on an astronomical subject – anything from sky mythology, the space race, beginning astronomy to galaxies and the Milky Way. Open nights are held on the Friday and Saturday and often the speaker finds themselves having to do two lectures on each night – there are so many people turning up that the clubhouse cannot take them all at once! Usually there are plenty of members' telescopes set up outside on the concrete pads so that visitors get to look through several during the night – weather permitting of course!

Other projects that members are involved in include CCD photography and conventional astrophotography and a couple of members have had images published in some of the astronomy magazines. There is also a fledgling radio astronomy group which is hoping to resurrect two large, but disused radio dishes on the site.

The Society only uses about half of the site the rest has been set aside for wildlife conservation. There is a small pond which has a wide range of animals living in and around it from a family of Coots to various kinds of newts. Also commonly seen are various owls, together with pheasants and partridge which seem to appear under your feet if you are wandering in the wilder areas of the site.

Mark Humphrys

Check out the Society's web site at http://www.norwich.astronomicalsociety.org.uk/

Getting to Norwich AS

The society meets every Friday from about 7:30 onwards. Visitors are always welcome so if you are in Norfolk please feel free to come along.

Take the A146 out of Norwich, this is the Trowse bypass, this will take you to the intersection with the "Norwich southern bypass". About 200 metres past the intersection turn right onto the B1332 (Norwich-Bungay road)

Follow this road through Poringland and Brooke. Carry on the road past a village called Kirstead (you don't actually pass through it – there is now a bypass). Go past a sign for KIRSTEAD-SEETHING on your left which is at the end of the bypass. The turning that you want is about a hundred metres further on, just past a layby. The turning is marked by a sign saying: SEETHING OBSERVATORY, SEETHING INDUSTRIAL ESTATE.

This is Harvey's Lane, continue down this twisty and rather narrow road for just over 1 mile. You come to a cross-road. Go straight over, into Toad Lane. You will pass the old USAF Airfield control tower on the left and a small private brewery on the right. The observatory is about 200 metres further on the left.

Beware of rabbits, hares, pheasants, hedgehogs, low flying barn owls and other wildlife crossing the road near the site.

An embarrassing incident

*recalled by **David Le Conte***

An article in the September 2002 issue of *Astronomy* magazine reminded me of an incident which took place a long time ago, in 1969 in Hawaii. I was Manager of the Smithsonian Institution's Astrophysical Observing Station on top of the Haleakala volcano in the island of Maui. The AAAS (the American equivalent of the Royal Astronomical Society which held its annual conference in Guernsey in 1999) was holding its annual conference in Honolulu, and I attended some of the sessions.

I had to return to Maui, however, in time to host the visit of AAAS delegates to our station, as part of a tour of scientific facilities. We had a busy day, describing the space-tracking equipment, which included a huge camera of a Schmidt telescope design, and a powerful laser system for satellite ranging (we sent up short pulses of laser light to satellites equipped with retro-reflectors, and measured the amount of time it took for them to be returned). Towards the end of the day most of our eminent visitors and their spouses had come and gone, and I retreated to my office to do some work, leaving one of my staff, Joe Coldwell, to deal with any remaining visitors.

After a while I re-emerged to find a very red-faced Joe, who introduced me to a visitor to whom he had just spent 15 minutes explaining how the laser worked, without, however, knowing who he was. The visitor's wife had eventually interposed that her husband was none other than Nobel Prize winner Charles H Townes, the pioneer of maser and laser technology! Poor Joe did not know where to put himself. Charles Townes, however, was charming and forgiving, and we had a pleasant chat.

The recent article was about the potential of an optical Search for Extra-Terrestrial Intelligence (optical SETI, as opposed to the radio SETI which has so far been pursued). Charles Townes had advocated such an approach as long ago as 1961, calculating that advance civilisations on extra-solar planets could produce lasers which would outshine their companion star, thereby sending messages announcing their existence.

Indeed, our own civilisation is now at the stage where it is feasible to produce such a nanosecond pulsed laser which would be brighter than the Sun. Optical techniques have so far not been used for SETI because, in Charles Townes's words, "radio was a habit of mind that people were stuck in." Radio has so far not produced any positive results, however. An optical search is now on for laser signals from the stellar neighbourhood. If it is successful we will have Charles Townes to thank, not only for the technology but also for the idea of optical SETI.

David Le Conte

The Twelve Moons in the North American Indian tradition

Month	Moon Name	Animal Symbol
Dec 22 – Jan 19	**Earth Renewal Moon**	Snow Goose
Jan 20 – Feb 18	**Rest & Cleansing Moon**	Otter
Feb 19 – Mar 20	**Big Winds Moon**	Cougar
Mar 21 – Apr 19	**Budding Trees Moon**	Red Hawk
Mar 21 – Apr 19	**Frogs Return Moon**	Beaver
May 21 – June 20	**Cornplanting Moon**	Deer
June 21 – July 22	**Strong Sun Moon**	Flicker (Woodpecker)
July 23 – Aug 22	**Ripe Berries Moon**	Sturgeon
Aug 23 – Sep 22	**Harvest Moon**	Brown Bear
Sep23 – Oct 23	**Ducks Fly Moon**	Raven
Oct 24 – Nov 21	**Freeze up Moon**	Snake
Nov 22 – Dec 21	**Long Snows Moon**	Elk

From: *Dancing with the Wheel – The Medicine Wheel Workbook* by Sun Bear, Wabun Wind and Crysalis Mulligan (Simon & Schuster, 1991).
With thanks to **Shirley Gradwell**