



February 2013

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Events list

Sunday 27 Jan: Full Moon

Saturday 02 February: **Nissan Jupiter Night event**

Thursday 07 Feb: 86th Cubs visit Cygnus Observatory, 5:30pm.
Help requested

Fri 08 / Sat 09 February: Deep sky observing opportunity

Sunday 10 February: New Moon

Saturday 16 Feb: Visit by the Brownies to Cygnus Observatory;
Help requested

Sunday 17 February: **Extraordinary General Meeting, 6:30pm**
7pm Lecture evening – Dr Juergen Schmoll:
“Setting up an observatory”

Mon 25 February: Full Moon

Wed 6 – Sun 10 March: Kielder Star Camp

All Society events

- are free,
 - are held in the Washington WWT facilities, and
 - evening meetings start at 7:00pm
- unless otherwise noted.**

Please bring a torch and warm clothing to any night-time observing sessions.
All observing sessions are dependent upon favourable weather and **may be subject to cancellation.**

Notice of Extraordinary General Meeting

Dear Members,

This month I need to report a change of personnel at the top of the Society – The Society Chairman, David Hughes, has had to step down from his position due to the current pressures of work. In the interim, the Vice Chairman, John Lynch, is acting Society Chairman.

This unexpected turn of events requires the Society to call an **Extraordinary General Meeting** (EGM) to elect a new Chairman. John Lynch is, naturally, putting himself forward for the role; the possibility of this type of event happening was part of the reasoning for creating the position of Vice Chair a while back.

All members are encouraged to attend the EGM.

The EGM will be held on **Sunday 17th February at 6:30pm**, and will be immediately followed by our regular lecture event. This month we are pleased to welcome back an old friend, Dr Juergen Schmoll from Durham University, on the topic of “Setting up an observatory.” From our experiences at the WWT, I know the setting up of an observatory is not a small undertaking, so it will be interesting to hear Juergen’s views on this topic!

January is turning into a particularly snowy month, but I hope that you manage to do some observing through the snowclouds if the opportunity arises.

Wishing you clear skies and ice free optics, Dave N., Editor.

SAS Yahoo Forum

The Society’s Yahoo group provides a forum for members to exchange ideas, ask questions, and a place to post their pics:

<http://tech.groups.yahoo.com/group/SunderlandAstronomicalSociety/>

The Art of Space Imagery

By Diane K. Fisher

When you see spectacular space images taken in infrared light by the Spitzer Space Telescope and other non-visible-light telescopes, you may wonder where those beautiful colours came from? After all, if the telescopes were recording infrared or ultraviolet light, we wouldn't see anything at all. So are the images "colorized" or "false coloured"?

No, not really. The colours are translated. Just as a foreign language can be translated into our native language, an image made with light that falls outside the range of our seeing can be "translated" into colors we can see. Scientists process these images so they can not only see them, but they can also tease out all sorts of information the light can reveal. For example, wisely done color translation can reveal relative temperatures of stars, dust, and gas in the images, and show fine structural details of galaxies and nebulae.

Spitzer's Infrared Array Camera (IRAC), for example, is a four-channel camera, meaning that it has four different detector arrays, each measuring light at one particular wavelength. Each image from each detector array resembles a grayscale image, because the entire detector array is responding to only one wavelength of light. However, the relative brightness will vary across the array.

So, starting with one detector array, the first step is to determine what is the brightest thing and the darkest thing in the image. Software is used to pick out this dynamic range and to re-compute

the value of each pixel. This process produces a grayscale image. At the end of this process, for Spitzer, we will have four grayscale images, one for each for the four IRAC detectors.

Matter of different temperatures emit different wavelengths of light. A cool object emits longer wavelengths (lower energies) of light than a warmer object. So, for each scene, we will see four grayscale images, each of them different.

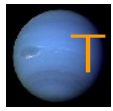
Normally, the three primary colors are assigned to these gray-scale images based on the order they appear in the spectrum, with blue assigned to the shortest wavelength, and red to the longest. In the case of Spitzer, with four wavelengths to represent, a secondary colour is chosen, such as yellow. So images that combine all four of the IRAC's infrared detectors are remapped into red, yellow, green, and blue wavelengths in the visible part of the spectrum.

Download a new Spitzer poster of the centre of the Milky Way. On the back is a more complete and colourfully-illustrated explanation of the "art of space imagery." Go to spaceplace.nasa.gov/posters/#milky-way.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Above: This image of M101 combines images from four different telescopes, each detecting a different part of the spectrum. Red indicates infrared information from Spitzer's 24-micron detector, and shows the cool dust in the galaxy. Yellow shows the visible starlight from the Hubble telescope. Cyan is ultraviolet light from the Galaxy Evolution Explorer space telescope, which shows the hottest and youngest stars. And magenta is X-ray energy detected by the Chandra X-ray Observatory, indicating incredibly hot activity, like accretion around black holes.



THE DARKE SIDE

With **Graham Darke**

Observing in memory of Sir Patrick...

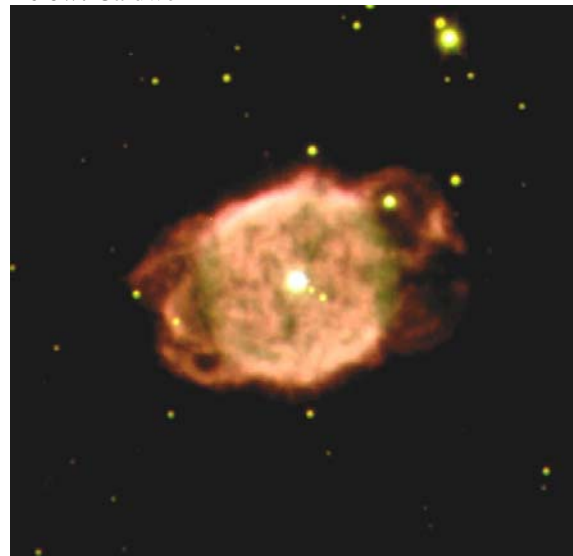
Patrick Moore was an inspiration to a great many people, someone whose enthusiasm and knowledge rubbed off on most that he met or who watched his TV programmes. I wondered how I might mark his sad passing in December and the answer was obvious to a primarily visual observer such as myself. Patrick compiled his own catalogue of 109 deep sky objects in 1995 which were named the Caldwell Objects. Patrick's full name was Patrick Alfred Caldwell-Moore, his surname was double-barrelled. For brevity he always shorted this to just Patrick Moore. To avoid confusion with the M of the Messier objects, instead of using "Moore", Patrick choose to use "Caldwell" for his catalogue. It was something of an oddity at the time for an observer whose primary interest was the Moon and planets to write a list of deep sky objects but I'm pleased that he did. It means that I can now share some of my favourites with you. Unlike Messier's catalogue the Caldwell catalogue contains a number of objects which can never be seen from the Northern Hemisphere. It also contains a number of objects which are quite challenging. As a progression from Messiers list, Caldwell marks an appropriate step up for those who have cut their observing teeth on the former. The Caldwell catalogue's objects are arranged in order of declination and so the first entry is quite close to the Northern Celestial Pole. From there the objects move ever Southwards. From our latitude we can see around half of the objects.

The first of them, and indeed the first on this month's sky tour is **Caldwell 1**, an open cluster of stars in the constellation of Cepheus. This cluster is also known alternatively as NGC188. From urban areas, this cluster is difficult to make out from the background haze of the sky and I struggle to see anything resembling a star cluster from the back garden except on the best nights and when the object is placed high up. From a dark site the faint members of the cluster begin to show themselves. Its probably best described as a loose cluster. Caldwell 1 is interesting in that it is one of the oldest open clusters of stars known. Generally the stars in clusters spread out over time but

Caldwell 1 is placed well away from the plane of the Milky Way where encounters with other massive objects may cause it to be dispersed.

Caldwell 2 is also in the constellation of Cepheus and whilst *easier* to see from the town it is by no means easy. It is a planetary nebula also known as NGC 40 but its common name is the **Bow Tie Nebula** due to its two lobes which sit either side of a bright core. Through my 6 inch Schmidt Cassegrain telescope, from home, at around 83x magnification the object appears as a bloated star with direct vision. With averted vision the object seems to grow in size before your eyes. From Derwent through my 5.5 inch refractor at 109x magnification I can see the bow tie shape clearly, although being a Star Wars fan I prefer to see it as an Imperial Tie Fighter coming towards me!

Below: Caldwell 2



Caldwell 6 is better known as the **Cat's Eye Nebula**, and features on a fine image taken by the Hubble Space Telescope during the 1990s. It can be found in the constellation of Draco and will require some skilled star hopping to find it if your telescope doesn't have go-to as there are no bright stars nearby to help. It is another planetary nebula and is quite easy to see even from the town.

Don't expect to see much in the way of detail unless you are prepared to really crank up the magnification. Try 400 or 500x and you'll be able to see that the core is brighter than the outer parts.

The 14 inch telescope in the Cygnus Observatory provides a nice view.



Above: Caldwell 6

My most memorable view of this object was at the first ever Kielder star camp when veteran observer Owen Brazell turned his 20 inch Obsession telescope towards Caldwell 6. The interlinking loops of gas towards the core were visible as distinctly green coloured.

Back to the tour! The most famous object (or rather objects) on the Caldwell list for us Northern Hemisphere dwellers is **Caldwell 14**. More commonly known as NGC869 and NGC884 – the Famous **Double Cluster** in Perseus. Most of the targets which appear in this column are picked as objects that most people might overlook in favour of brighter objects. I am making an exception for the Double Cluster. Most people will have seen it or observe it regularly, I know I do. It is without doubt one of the most impressive sights in the night sky. It can be found located between the W shape of Cassiopeia and the inverted letter Y shape of Perseus. Best enjoyed from a reasonably dark site and with a low magnification wide field of view eyepiece, it's an object that looks as good visually as any photograph I've ever seen of it. The clusters themselves are set against the backdrop of the many fainter stars of the Milky Way which gives a richness to the view and a number of red coloured stars are visible. There is much debate as to why Messier did not include it on his list. The answer is probably to do with the

location of the clusters which are well away from the ecliptic plane where Messier and his contemporaries would look for new comets. I'm pleased that Sir Patrick Moore put this on his Caldwell list. It's the one deep sky object that I will fondly remember Patrick by when observing.



Above: The Double Cluster in Perseus

The final object on this month's tour is not a Caldwell object but one of my favourite double stars. It's **Eta Cassiopeia** and it is a gem that's easy to find and great to observe from wherever you are. It's the star visible to the naked eye located between the two stars Tsih (the middle star of the W) and Shedir (the lower right star). Through the telescope the primary appears to me as pale yellow and the secondary component, which is fainter, as purple or crimson depending upon the atmospheric conditions.

I hope that you will take up the challenge to observe some of these objects and I'll be back next month with some more obscure gems....

Clear Skies,

Graham

Society Update

with Natalie Lowes

Now the Christmas decorations are back up in the attic and light pollution from neighbours' Christmas lights are but a memory, it's time again to tell you what the Society has been up to and what's coming up in the near future.

Luckily for everyone, the world didn't end on the 21st of December, but members of our society and Newcastle Astronomical Society did join us at Cygnus observatory to usher in the loosely predicted apocalypse. Unfortunately Armageddon was obscured by complete cloud cover, however we were honoured with an unexpected visit from Batman.

We met again at the Grey Horse in Boldon on the 27th for the Winter Benker Night. It was great to see so many faces old and new, and enjoy a catch-up over a pint. As promised last month, we have been opening up the observatory more frequently to make the most of the Winter's dark skies, and a last minute opportunity came up on New Year's Eve for members to welcome in the New Year with clear skies and some impressive deep sky and planetary imaging. If you'd like to see some of the fantastic images taken by society members at New Year, please visit our Facebook page where many of them have been displayed.

Following another visit to our dark site in Derwent, the club got in gear for the Stargazing Live events at Washington Wildfowl Park. Unfortunately, due to an issue with the ground at Gibside, we were unable to attend the BBC event. However we did host our own public event at the Wildfowl Park, which was well attended by members of Newcastle, Durham, Cleveland and Darlington, Northumberland and South Shields Astronomical Societies. We were also visited by 40 members of the public, who were generously treated with 20 telescopes to look through, as well as having the opportunity to utilise the combined expertise of the 27 astronomers from all 6 societies. We would like to give special thanks to our members, and extend our gratitude to the members who attended from other societies for making this event so successful.

On Friday 11th and Saturday 12th, it was all hands on deck again for our planned Jupiter Nights events, again at the Wildfowl Park. Our members once again kindly gave up their time to introduce 174 members of the public to the night skies. Sadly, the weather was not on our side, so we couldn't show the public as much of the cosmos as we would have liked, however we managed to keep our public happy with introductory talks, displays of our astrophotography, a children's craft area and answering the many intriguing questions about the hobby we love. In addition to this, we were pleased to be joined by Astromedia who had a stall selling their nifty cardboard instruments. Once again, our members' dedication, hard work and passion made this another successful year for SGL, and the contribution of the staff and volunteers at the Wildfowl and Wetlands Trust was once again outstanding. We look forward to hosting more joint events like this in the future.



Above: Natalie talking about Orion at the SAS Jupiter Nights

The success of our Jupiter Nights was echoed in our Sunday night workshop on the 13th, when we were pleased to welcome a flood of new and potential members. We once again had fun meeting you all, and hope to see you soon at one of our future observing events.

Speaking of which, we still have more to come as January comes to a close.

- On Saturday the 19th, the proposed public event at Saltholme RSPB was unfortunately cancelled due to the weather;
- On the 20th, at our regular lecture meeting, Dave Newton told us all about Astronomy before Messier;
- On the 7th February we will be visited by the Cubs and then the Brownies on the 16th February. Once again we would **appreciate the help of anyone who can attend with telescopes** to help us out.
- We will be hosting the **final Jupiter Nights Event** at the Nissan Social club on 2nd February. Please keep your eyes on the website and Facebook page for further information.

Happy New Year to all of our members and keep looking up as well ahead!

Stay up to date

Keep up to date with all society developments on the website www.sunderlandastro.com and why not sign up for the news group. Also check out our Facebook and Twitter pages.

Some Old Controversies in Transactions: Part II



By "Old Boots"

{An old and esteemed correspondent continues his reminiscences of the controversies which raged in the earlier numbers of this journal.}

"... if I'm ever in a devil of a hole and want to get out of it, give me Shackleton every time ..."

Sharif Don't Like It!

Transactions saw more controversy when "Greenfields" offered more thoughts on the 'flood' (much to the disdain of members), when he proposed to design and construct an observatory for public use. Not only for astronomical usage, but as "a retreat and haven" for the privileged when the second 'flood' finally did arrive.

In volume 4, page 191, it would appear that he had taken R.A.P.'s lecture quite literally! He stated; *"It came to me in a dream following the lecture by R.A.P. My design is not that thought of by run-of-the-mill scientists, but that of seafarers and saints and of the astronomical art and wise regulations of Aristotle. It shall resemble a wharf, be located on high ground, on stilts and be erected without the sound of axe, hammer or any tool of iron. The timber shall be felled and prepared in the Forest of Jocks Pike, be conveyed by lake in barges to Kielder and thence by land to the highest point."*

He went on to state that no site in Sunderland was of adequate altitude to avoid the flood, so would travel from "here to there" (wherever "there" was) in R.A.P.'s Mk. II Aeroblomp (readers may recall that the Mk. I was confiscated by French authorities), and that those on the *guest list* should assemble at the rear of Sunderland Subscription Library at a given date and time.

In the following weeks, both the public and Society members were fascinated by the sight of R.A.P. and Greenfields practicing maneuvers in the Mk. II above Fawcett Street.



Above: R.A.P. and Greenfields practicing landing maneuvers above Sunderland Subscription Library without a net. One can only imagine the state of their hair!

Needless to say, many members thought that if R.A.P. and Greenfields had gone to these lengths then the coming of the second flood must be *true*. This reasoning saw *Aficionado* well on the warpath, stating; *"If any member believes this 'hokum' (!) then they should be wrung out and hung up to dry. I witnessed this malarkey more than once during my travels in the Congo!"*

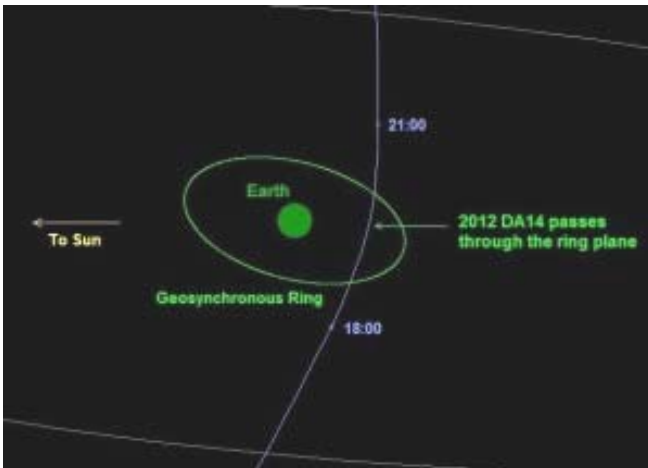
Usurping control of the magic lantern and showing images of rain-dances he had witnessed in the Congo was short lived however, when he was seized by members and after a brief struggle and some hiatus was taken to hospital with calamitous, but not life threatening injuries.

{To be continued}

NEWS

Asteroid 2012 DA14 to sweep close on February 15, 2013

A near-Earth asteroid – called 2012 DA14 by astronomers – will pass very close to Earth on February 15, 2013. Astronomers estimate that, when it's closest to us, it'll be within the orbit of the moon (which is about 240,000 miles away), and within the orbits of geosynchronous satellites (about 26,000 miles up). 2012 DA14 will be about 21,000 miles (35,000 kilometres) away. It will not strike Earth in 2013. Astronomers' calculations of asteroid orbits can be trusted. After all, even decades ago, they knew enough about calculating orbits to send people to the moon and bring them safely back, and today we are able place our space vehicles in orbit around objects as small as asteroids.



So, no, 2012 DA14 won't strike us in 2013. There was a remote possibility it might strike us in 2020, but that possibility has been ruled out also.

What will happen when it passes us? The short answer is ... nothing. On the day it passes, most of us won't see it or be aware of its passage, in any way. The asteroid won't alter the tides. It won't cause volcanoes. It'll just sweep closely past us – as millions of asteroids have done throughout Earth's four-and-a-half-billion-year history – some in your own lifetime.

The asteroid will be within range for small telescopes and solidly mounted binoculars, used by experienced observers who have access to appropriate stars charts. Here's what NASA says about its visibility:

On February 15, 2013 the asteroid will travel rapidly from the southern evening sky into the northern morning sky with its closest Earth approach occurring about 19:26 UTC when it will achieve a magnitude of less than seven, which is somewhat fainter than naked eye visibility. About 4 minutes after its Earth close

approach, there is a good chance it will pass into the Earth's shadow for about 18 minutes or so before reappearing from the eclipse. When travelling rapidly into the northern morning sky, 2012 DA14 will quickly fade in brightness.

Asteroid 2012 DA14 is a little guy, compared to some asteroids, although its size has not been pinned down precisely. It is thought to be about 45 metres across (nearly 150 feet across), with an estimated mass of about 130,000 metric tons.

If a space object 150 feet wide were to strike our planet, it wouldn't be Earth-destroying. But it has been estimated that it would produce the equivalent of 2.4 megatons of TNT. How does that compare with other known impact events on Earth? In 1908, in a remote part of Russia, an explosion killed reindeer and flattened trees. But no crater was ever found. Scientists now believe a small comet struck Earth. That event has been estimated at 3 to 20 megatons. So 2012 DA14 is in the same approximate realm as the Tunguska comet (which, actually, might have been an asteroid instead). It would not destroy Earth, but it could flatten a city.

Of course, about 70% of our world is covered by oceans. That means the most likely landing spot of any incoming asteroid is in the water – not on a city or other populated area.

Astronomers at the Observatorio Astronómico de La Sagra in Spain discovered 2012 DA14 in early 2012. We know 2012 DA14's orbit is similar to that of Earth. That is one reason the asteroid eluded astronomers until recently. You can be sure that many astronomers are carefully tracking 2012 DA14 now.

The orbit of 2012 DA14 is an inclined ellipse. In other words, it's tilted slightly with respect to Earth's orbit around the sun, and, like Earth's orbit, it's not circular but elliptical – like a circle that someone sat down on. According to Bad Astronomer Phil Plait, who appears to have used a computer program to look at its orbit:

The asteroid spends most of its time well away from our planet. However, the path of the rock does bring it somewhat close to the Earth twice per orbit, or about every six months. The last time it passed us was on February 16 [2012], when it was about 2.5 million km (1.5 million miles) away, equal to about 6 times the distance to the moon. That's usually about the scale of these encounters — it misses us by quite a margin.

If we know it will miss us in 2013 and in 2020, why are astronomers still watching? In fact, the orbit of 2012 DA14 is not entirely pinned down, although it is known well enough to say for sure: it will not hit us next year, or in 2020.

But it will come close on February 15, 2013! It should be close enough to catch the attention of virtually everyone on Earth in February 2013, on what's sure to be a media field day.