

Gnomon

Newsletter of the Association of Astronomy Education

Vol. 30 No.2

ISSN 0952 326X

WINTER 2011

The dazzling Winter Stars: Dark Sky Parks and Reserves

In November 2009, part of a forest in Scotland earned the prestigious International Dark Sky Association (IDA) Dark-Sky Reserve status. The unrivalled quality of its night skies, reinforced by agreements with the scattered local inhabitants to conform to best lighting practice, meant that the 300 square mile fastness of Galloway Forest Park, between Dumfries and Stranraer, was named as probably the best stargazing site in the UK. Liaison with the IDA was ensured by a dedicated team, including the indefatigable Steve Owens and Dan Hillier (IYA2009/Dark Sky Scotland), Keith Muir, Head of Recreation for the Scottish Forestry Commission, and Campaign for Dark Skies (CfDS) committee member and IDA board member Martin Morgan-Taylor. Thus, Galloway Forest Park became the first Dark Sky Park in Western Europe.

There are currently only four other

Dark Sky Parks in the world, three of them in the USA: Natural Bridges National Monument (Utah), Cherry Springs State Park (Pennsylvania), Geauga Park (Ohio) and Hortobagy Park (Hungary).

Three other UK areas of tranquillity and dark skies are also interested in following the example of Galloway: the Brecon Beacons, Sark and Exmoor. When a team of CfDS members from England and Wales met representatives of the Welsh Assembly in Cardiff in October 2009, delegates from the Brecon Beacons National Park (cont. on p2)



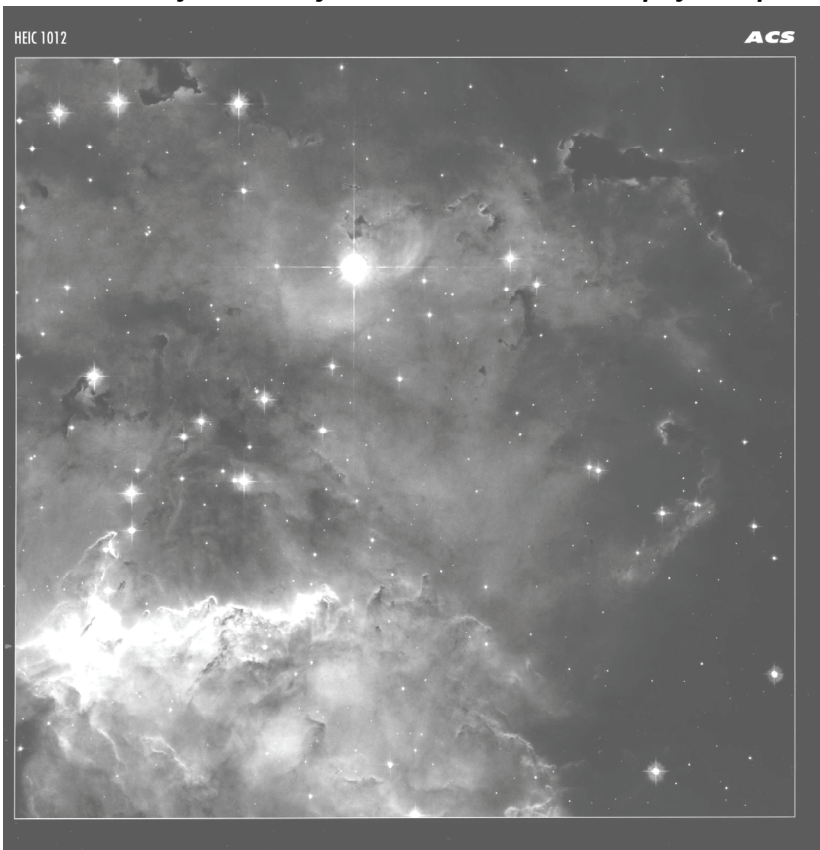
Hubble snaps sharp image of cosmic concoction

A colourful star-forming region is featured in this stunning new NASA/ESA Hubble Space Telescope image of NGC 2467. Looking like a roiling cauldron of some exotic cosmic brew, huge clouds of gas and dust are sprinkled with bright blue hot young stars. Strangely shaped dust clouds, resembling spilled liquids, are silhouetted against a colourful background of glowing gas. The star-forming region NGC 2467 is a vast cloud of gas - mostly hydrogen - that serves as an incubator for new stars. Some of these youthful stars have emerged from the dense clouds where they were born and now shine brightly, but many others remain hidden.

The full beauty of this object and hints of the astrophysical processes at work within it are revealed in this super-sharp image from Hubble. The hot young stars that recently formed from the cloud are emitting fierce ultraviolet radiation that is causing the whole scene to glow while also sculpting the environment and gradually eroding the gas clouds. Studies have shown that most of the radiation comes from the single hot and brilliant massive star just above the centre of the image. Its fierce radiation has cleared the surrounding region and some of the next generation of stars are forming in the denser regions around the edge.

One of the most familiar star-forming regions is the Orion Nebula which can be seen with the naked eye. NGC 2467 is a similar but more distant example. Such stellar nurseries can be seen out to considerable distances in the Universe, and their study is important in determining the distance and chemical composition of other galaxies. NGC 2467 was discovered in the nineteenth century and lies in the constellation of Puppis, NGC 2467 is thought to lie about 13 000 light-years from Earth.

The picture was created from images taken with the Wide Field Channel of the Advanced Camera for Surveys through three different filters (F550M, F660N and F658N). These data were taken in 2004.



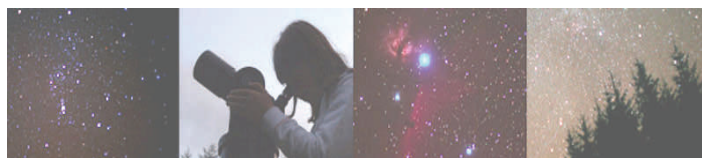
☞ (cont. from p1) (to the north of Merthyr Tydfil in South Wales) were very positive about preserving its starry skies.

The darkness of the sky is rated on Sky Quality Meters on a scale up to 24 (utter darkness). Galloway Park scored 23 (though the sky was cloudy at the time!). Professor Ian Morison, after his visit said "It's the best view I've ever had".

CfDS is very glad to see the Park thus recognised, but continues to fight for the optimum night sky for ALL Britons, whether they live in rural fastnesses or urban centres. More information on the Park, accommodation, courses and observing opportunities is at:

📄 www.gallowayastro.com.

A Sunday Telegraph article on June 28th 2010



examined a trend among estate agents to prioritise a view of the night sky when offering properties in rural areas – could it be that people are beginning to miss what they have lost?

Bob Mizon

Bob is UK co-ordinator of the British Astronomical Association's Campaign for Dark Skies

The 50th Anniversary of Yuri Gagarin's first flight



Believe it or not, the 50th anniversary of Yuri Gagarin's first human spaceflight is coming up on 12th April 2011. Gagarin blasted off from the Baikonur Cosmodrome (now in present day Kazakhstan). The UK's space community has been looking at ways to celebrate this milestone through

events and activities in the run-up to, during, and after the anniversary next year.

A launch event has been organised at the House of Commons and there is a website online at:

📄 yurigagarin50.org

which has a searchable calendar of events associated with the anniversary. This website will be developed over the coming months to provide information and resources relating to Gagarin, the legacy of his spaceflight and current space activities.

Gagarin applied for the six-week cosmonaut screening process in 1960 with just 230 hours of flying experience. He and 19 others were selected to become cosmonauts. Of these 20 men, 12 eventually completed space flights. Gagarin and fellow cosmonaut Gherman Titov, front-runners in their class, were both contenders for the Vostok 1 flight.

A worldwide hero's welcome awaited Gagarin when he returned to Moscow. He was appointed a deputy of the Supreme Soviet, awarded the Order of Lenin, and named hero of the Soviet Union. The fanfare eventually began to subside, and he again became active in cosmonaut training. Gagarin was on the backup crew for Soyuz 1 and reportedly was a leading candidate for the planned Soviet piloted lunar landing. He was killed on a routine jet proficiency flight in March 1968.

YuriGagarin50 has various projects under development, including "Rockets for Yuri", a planned UK-wide stomp/water rocket launch on the 12th April 2011, and the muDEX educational microgravity experiment, which could give schools the opportunity to add their own data to a fluid research project carried out on the International Space Station.

Ed

Subscription Rates:

Individual Members..... £14.00
Retired Members..... £12.00
Corporate Members
(e.g. schools, colleges etc.)..... £28.00
Members receive yearly four issues of *Gnomon*. Corporate Members will receive three copies of each issue.
A £2 discount is made on all annual subscriptions paid by direct debit.

Extra Copies:

0 - 10 £1.00 per copy
11 - 50 £0.75 per copy
51 + £0.50 per copy
(Back numbers, not less than one year old, half these prices.)

There will generally be a 10% discount to AAE members on all publications and advertising rates. Practising teachers may claim their subscriptions as an allowance against income tax, effectively reducing their contributions.

All communications (except those to the Editor) should be addressed to:

Association for Astronomy Education
The Royal Astronomical Society
Burlington House, Piccadilly
LONDON W1J 0BQ

📄 www.aae.org.uk

For all enquiries concerning the newsletter, contact the Editor:

Anne Urquhart-Potts
Harriets, Ruan High Lanes
Truro, Cornwall, TR2 5LR
📧 anne@atdupotts.co.uk
Telephone: 01872 501110

Any photographs sent to the Editor by email (preferred) should be sent in a common format (TIF or JPEG) with resolution not less than 300 dpi © Material from *Gnomon* may be used by members in scholastic applications. Publication elsewhere *must* have the written permission of the AAE or the authors.

Advertising Charges:

Whole page..... £120
Half page..... £60
Quarter page..... £30
Inserts..... £75
(Inserts may be of any size which may conveniently be inserted in the newsletter. Heavy items may incur an additional charge for postage.)
A 25% reduction is made for advertising in all four issues.

Publication Dates:

These are at the equinoxes and the solstices, that is four times a year. Copy deadlines are four weeks before these dates.

Raising Standards and Enriching the Curriculum with GCSE Astronomy

News of a one-day GCSE Astronomy INSET course run for the Yorkshire Science Learning Centre* in January.

Date: Friday 21st January 2011 from 9.30am to 4.30pm
Venue: Ermysted's Grammar School, Skipton.

GCSE Astronomy has seen a steady rise in popularity amongst UK secondary schools over the past few years. Whether you already offer, intend to offer, or are investigating the possibility of offering GCSE Astronomy, this course is for you. Julien's expertise and enthusiasm



have made Ermysted's Grammar School one of the largest centres for GCSE Astronomy in the country. A Specialist Science College, the school dates from 1492, the date of the publication of Copernicus' famous 'De revolutionibus orbium coelestium', which began the revolution from a geocentric to a heliocentric solar system. In other words, the school is the same age as modern astronomy!

Outline Programme:

Session 1: *Cosmology*: A key note by Michael Rowan-Robinson, Professor of Astrophysics at Imperial College London.

Session 2: *The GCSE Astronomy Course*: A look at the content, assessment structure and scope for expanding or enriching the science curriculum.

Session 3: *Student Voice - How was it for them?*: A presentation by a group of Year 9 students from Ermysted's Grammar School.

Session 4: *Examination Question Workshop*: A review of some recent examination questions highlighting common errors and features of high quality answers.

Session 5: *Controlled Assessment Workshop*: An introduction to the new Controlled Assessment system, including hints and tips for producing high scoring controlled assessment and a review of Edexcel support materials.

Session 6: *Resources to Support the Teaching of GCSE Astronomy*: Equipment and resources which are effective in supporting learning and teaching. A resource pack will be provided for each delegate.

Session 7: *Your Next Steps*

The course fee is £130. If you would like to book a place, please call 0114 2254891 to ask for our booking form or enrol online at our web portal:

www.slcs.ac.uk/yh

(and search for course code YHC10379).

The presenter of this course, Julien King, is a physics and astronomy teacher at Ermysted's Grammar School. He is the principal moderator for GCSE Astronomy (Edexcel) and a Fellow of the Royal Astronomical Society.



*(The national network of Science Learning Centres is a joint initiative by the Department for Education and the Wellcome Trust).

Brilliant Fireball of 8th December

Reports are coming in of a brilliant fireball seen on the evening of Wednesday, 8th December 2010 at around 17:40 UT. A more precise time for this event has still to be determined.

Sightings indicate that the fireball was visible over an extremely large area of the country, with reports being received from locations as far apart as Bath, Northampton, Leicester and the Isle of Man.

The peak brightness of the fireball was in excess of magnitude -8, and eyewitnesses report that the object fragmented towards the end of its trajectory.

Further reports of this event are urgently required. Did you see this fireball yourself, or do you know of someone else who saw it? Those belonging to local astronomical societies are asked to enquire of other society members whether they witnessed the event. Please take care not to bias eyewitnesses beforehand by discussing with them what you or others saw.

Reports should contain some or all of the following information:

- 1) Name, address and contact details of the observer.
- 2) Date and time of the event in UT (GMT), as accurately as this can be specified.
- 3) Location of the observer when witnessing the fireball. If driving a car please specify the road, location and the direction the observer was driving.
- 4) The path of the fireball against the background stars, as accurately as this can be described. If this is not possible, then please try to answer questions 5) and 6) below:
- 5) The compass direction and altitude (in degrees) of the fireball when it was first seen.
- 6) The compass direction and altitude (in degrees) of the fireball when it was last seen. Please state if something obscured the view of the end (e.g. if it went behind a tree or a building).
- 7) A general description of the colour and appearance of the fireball, whether this changed during the trajectory and any terminal burst or break-up at the end.

Please send reports to the BAA as soon as possible or to Dr John Mason at the e-mail address below:

 docjohn@dircon.co.uk

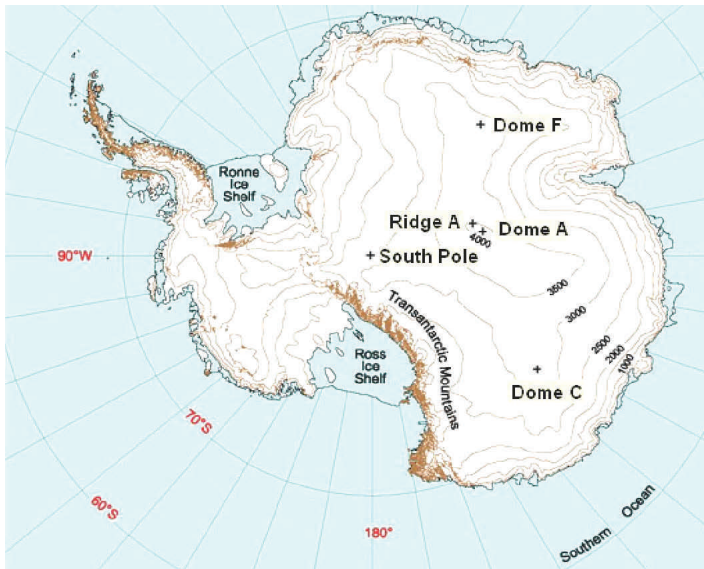
(with thanks to those who e-mailed me news of this event—Ed)

Letter from Japan Under the Moon

A century after Amundsen and Scott's race to the South Pole, there is a new Antarctic race on. This time the "prize" is to be the first to establish a moderate sized optical/infrared telescope on the Antarctic plateau. Several countries including Australia are in the running, but some interesting new competitors have now emerged.

The University of New South Wales (UNSW) in Sydney has been leading a site-testing campaign for over a decade, using ever more sophisticated robotic observatories to answer the questions "Just how good is Antarctica for astronomy?", and "Where is the best observing site in Antarctica?". Early efforts focused on the South Pole itself, though driven mainly by the logistical support offered by the United States' substantial base facility there. Aside from the obvious advantage that stars never change in altitude as seen from the South Pole, the pole is not the highest (and thus driest and coldest) point in Antarctica, and suffers both from auroral activity and man-made contamination (dust, smoke, and even light pollution). In 2005 attention switched to a location known as "Dome C" at 3250m altitude, where France and Italy have established a base manned all the year round. Measurements of the atmospheric turbulence above Dome C were extremely encouraging, indicating that if a telescope could be positioned atop a 30m high tower it would be above nearly all of the ground layer disturbance and enjoy images as good as 0.1" for hours at a time. This is three times better than the best image quality ever achieved at temperate observatory sites like Mauna Kea in Hawaii, or Cerro Paranal in Chile.

A proposal to build and operate a 2.5m telescope at Dome C, the Pathfinder for an International Large Optical Telescope (PILOT) has received strong scientific backing, but has yet to attract the significant amount of funding required to commence construction. In the meantime, Japanese astronomers have been exploring a site known as Dome F about 500m higher, and US astronomers are



Map of the Antarctic continent, showing the locations of the South Pole, Dome C, Dome F, Ridge A, and Dome A. (Image credit: UNSW / Australian Antarctic)

considering a location known as Ridge A. Not to be outdone, the Chinese have now commenced construction of a base at Dome A, the highest point in Antarctica at an altitude of 4100m. Being relatively new to the Antarctic exploration business, the Polar Research Institute of China has invited Australia to provide both expertise and equipment for characterising the Dome A environment, in

exchange for the logistical support necessary to reach such a barren and remote location (currently a 2-3 week traverse by tractor!).

UNSW has designed and constructed a new series of stand-alone robotic observatories known as PLATO (for PLATEau Observatory). Each PLATO consists of an engine module containing 6 diesel engines, 4000 litres of fuel, and solar arrays to deliver up to 1 kW of power year-round in temperatures that can drop to -75°C. A separate instrument module contains the control, computing, and communications equipment for the suite of instruments supported by PLATO. PLATO is required to operate unattended for up to a year, and to regularly transmit data via the Iridium satellite phone network.

Among the instruments currently supported by the PLATO at Dome A are:

- The Chinese CSTAR array of four 14.5cm aperture telescopes, each with a different colour filter, which monitors a 4.5° field around the south celestial pole looking for transiting exoplanets, supernovae, and other time-variable phenomena as well as measuring the brightness of the sky background.
- The US preHEAT telescope, which has confirmed that the very dry air above Dome A makes it the premier spot on Earth for detecting the faint glow at sub-millimetre wavelengths coming from cold gas clouds in our Milky Way where stars are being born, as well as from the most distant and youngest galaxies.
- The Australian and New Zealand SNODAR, which is an acoustic radar that probes the atmospheric turbulence that gives rise to the twinkling of stars. It works by sending an intense low-frequency pulse up into the atmosphere and "listening" for the return signal scattered off temperature variations and wind shear, much like underwater sonar.
- "Nigel", a fibre-fed spectrometer and CCD detector for monitoring optical sky brightness, and particularly the aurora contributions, of the sky over Dome A.
- Gattini, a very wide field optical camera designed to measure accurately the sky brightness, airglow, and cloud cover which will help define the maximum length of time a large telescope can observe for uninterrupted, and how deep into space it could see.

Following on from these, the Chinese plan to deploy AST3, an array of three 0.5m wide-field optical telescopes that will be able to monitor millions of star for transiting planets for weeks at a time in winter, something that existing surveys from mid-latitude sites cannot do. Building on the PILOT concept, plans are also underway for a 4m wide-field infrared telescope named KDUST. New PLATOs will soon be deployed to Dome F and Ridge A to assist the efforts underway there. For more information about PLATO, and live Webcam feeds from Dome A, please see:

<http://mcb11.phys.unsw.edu.au/~plato/plato.html>

Stuart Ryder

 sdr<at>aao.gov.au

Twas Christmas in the Planetarium

It was Christmas in the planetarium.....

No it was not quite: actually, it was a couple of days before the schools broke up for Christmas and I had been asked to do my show in a special school on Teesside. This was the last of my school visits with the inflatable dome before I allowed the insurance to lapse so that I could devote my time to the manufacture of the domes for use by others.

I was engaged to do two shows in the morning but only one in the afternoon. This gave me an hour and a half to do the last show and I was surprised that the staff had allowed that much time for one class. When I queried this, they said that I would understand when I saw the class. Although the school was designated as Special, this did not necessarily mean that the children were not teachable. Many of the pupils had some physical disability which prohibited them from being in the education mainstream. The morning sessions went very well indeed, the pupils appreciating the presentations and showing their interest.

The morning's sessions inside the dome prevented me from seeing round the school but at lunch time I was taken on a tour of the establishment by a friendly member of the staff. The building was adapted to help the movement of the handicapped around the school. There were no steps anywhere and if the pupils had to negotiate going up or down to another level, shallow gradient slopes were provided. Even so, having seen all this background, when at last I was invited to go into the classroom of the pupils for the last session of the day I was totally unprepared.

In this Special School this class was a degree more "special" than the others. Each of the pupils was, in some way or other, dependent upon some form of apparatus ranging from wheelchairs to other specially designed constructions. I do not wish to go into the details which might be described as harrowing, but I want to mention two boys. One boy, Simon, had a deformity which prevented him from walking properly. His left leg was bent around in a semi-circle and as he walked his torso had to move in an orbit of its own. Simon used a special walking stick as an aid. The point I wish to make is that Simon busied himself in helping those other pupils who were less mobile than he was. The star of the show was a thin boy, let's call him Tommy. Tommy lived in a frame like a newly planted tree does. This frame was a metal cylinder which reached up to his hips. It held him upright with his legs and hips well and truly clamped. This frame was fixed upright on a wooden board and underneath this board were attached four castors which allowed Tommy to be moved around. Above this frame, Tommy bent his upper body and waved his arms, and laughed and shouted with all the rest. When Tommy wanted to move from A to B, it was Simon who pulled the rope on Tommy's board. I now appreciated why this class had been allocated extra time.

The problem was how to get them into the inflated dome. The teacher, a young lady who I considered her to be a species of saint, was worried. She had never seen an inflatable dome before that very morning and could not anticipate all sorts of difficulties facing her charges in this situation. I told her that we would take it slowly and gently and I would give it my best shot. The children were excited as all young children are at the thought of going into the planetarium and we made our way slowly along the corridors to the hall, each by his or her special means of perambulation and bringing up in the rear were Tommy with Simon doing his self imposed duty.

When they finally reached the dome and appreciated exactly what it was I could see that, although they were all

fascinated, each child had a certain reservation based upon the particular disability that he or she had. I had to tread very carefully to dispel any worries.

The children were shown how the fan worked and that the dome was like a balloon, except that it was sitting on the floor, so that it was more like a hovercraft. In case you do not already know, let me explain that my domes do not have a tunnel and entrance is made through a zip door. The fan pressure can be varied and the pressure is turned up high when someone is entering or leaving by the door but is turned low down when the door is closed and the show is in progress. Only a few of this class would be able to gain entrance through the zip door.

Firstly I would have to show this class that the dome was not solid and that the walls were flexible. I selected one boy called James who, although disabled, could roll on the floor. I opened the door to show him that the inside was illuminated and that there was a young lady helper already inside the dome. We could all hear that there was music playing inside. Then I asked James to lie down on the floor alongside the wall of the dome. I followed this up by asking him to imagine that he was lying on a bed and that he was going to pull a blanket over himself. I said to him "Roll over and pull the blanket over your body and you will find yourself inside the dome". James did so and yelled with excitement when he found himself inside. "Now roll back through" I told him. When he reappeared, the class cheered.

So far so good! Now to allay the fears of the wheel-



chair users, I explained to the class what I was about to do. "I am going inside and I'll cross to the part opposite the door. Then I am going to reach underneath the fabric with one hand and pull it down. At the same moment, with my other hand, I am going to push the fabric away from me". This I did, and in two seconds the whole dome had shot over in an arc over my head and landed on the floor in a crescent shaped bundle. This is always spectacular when seen for the first time.

Once again they all cheered, but the point was made; they knew that they need not be worried about being trapped inside.

When I first began using this design of dome the local fire brigade were worried about the problem of escape in an emergency and I had to give them a demonstration to substantiate my claim. The top brass from the regional fire brigade were all assembled and they had brought along three video recorders on tripods to record the event. When I was prepared I shouted from inside "Are you ready?". They shouted back "Yes", so I performed the trick which took exactly two seconds. The fire brigade were astonished. The speed was entirely unanticipated, so much so that they had not even switched on the recorders.

☞ (cont. from p4) So, back to this special class. The dome took about five minutes to inflate again and we were ready for the wheelchair demonstration. I showed them the "No door" technique. The teacher and I took a wheel each and had arranged for the assistant inside to be ready to receive the chair as it came through. We moved the back of the chair to the fabric wall and shouted "One Two Three!" And at the count of "Three" we had lifted the fabric, pushed the chair in and replaced the fabric on the floor, all in a couple of seconds. The air in the dome seems slow to leak out, as though it does not realise it can escape. Very little is lost before the fabric is back down on the floor. This was a great game and slowly but surely all of the class was assembled inside talking to the young assistant. All that was, except Tommy with his faithful friend Simon. I gave Tommy the option of going in like a wheelchair or being lifted out of his frame and rolling in like James had done. He chose the wheelchair option, so after "One, two, three" Simon and I had worked the magic and Tommy was inside the dome looking around with wonder in his eyes.

After all that, the actual programme might have been described as an anti-climax, but they were all so excited at overcoming the obstacle that nothing could dampen their

enthusiasm. It was a marvellous show. Getting out was a cinch, so easy with my two-second method. Of course this was an amazing experience especially when seen from the inside. One second, you are inside the dome and the next second you are in the school hall with a deflated dome on the floor. They cheered so loudly that the Head came running to see what the fuss was about.

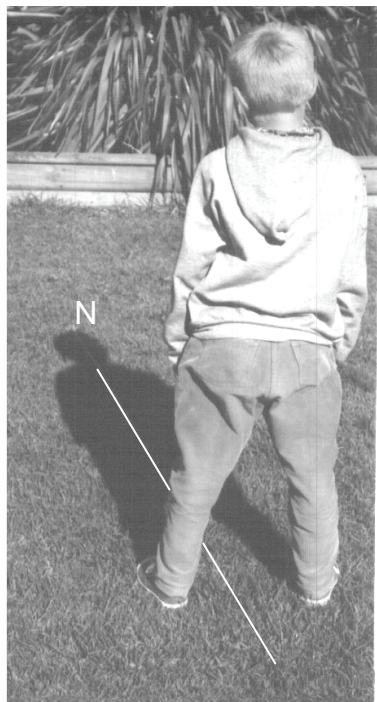
The progress back to the classroom can only be described as triumphant, with the kids shouting and singing. The teacher's eyes were brimming over. She said that she had never seen the class so excited and motivated. Just before they assembled for their buses and taxis, I could see that the teacher had arranged a vote of thanks. Tommy called over to me and beckoned me to come closer. When I got there, he asked everyone to be quiet. Tommy became quite formal as he delivered his prepared speech. When this was done and the class had once again lifted the roof off with their noise, Tommy leaned over as close to my ear as he could and he grabbed my shirt to pull me closer. He said in a confidential manner "This year, I am going to have a REALLY SMASHING CHRISTMAS".

Ray Worthy

(I have deflated a dome like this many times—spectacular! Ed)

Curriculum Corner

A Useful North/South Line



In the last issue, students discovered that a north/south line can be made at solar noon and that they could use it for compass bearings and for introducing a simple method of finding their way around the ecliptic. They are now well on the way to doing some practical astronomy. Have the students stand astride their line just after dusk, facing north.

They can make a circle around their eyes and nose by touching the tips of their thumbs and middle fingers together as in the photo below.

The Plough (Big Dipper) will be inside the circle with Polaris in the centre.

All the stars inside the circle are circumpolar around the North Celestial Pole.

Vocabulary:

astride
The Plough
(Big Dipper)
North Celestial Pole
circumpolar



Eric Jackson

Orion Star Count Week

How many stars can you see with your own eyes in the constellation of Orion? That is the question that will be addressed during the Orion Star Count Week from Monday 31 January until Sunday 6 Feb 2011. The constellation of Orion will be visible throughout the night and the Moon is near to new, so that viewing will be near optimum.



People across the UK, including schools, astronomical societies and universities, will be asked to note how many stars they can see within the four corner stars of Orion: Betelgeuse, Bellatrix, Rigel and Saiph.

Materials are being prepared which give details of how the general public, astron-

omy societies and schools can join in, along with activity ideas to run alongside the star count. These materials will be on the Campaign for Dark Skies and Campaign to Protect Rural England websites (below). It is hoped that there will be public observing sessions and talks and also an opportunity to extol the virtues of efficient lighting.

Most people in the UK have not experienced a night sky full of stars. It is hoped that this star count will highlight the problem of light pollution and to encourage people to adopt good lighting practices. It is also a good opportunity to increase an awareness of astronomy and in particular the wonderful objects that can be seen in Orion.

More information from 10th January on the following websites:

:
www.cpre.org.uk/starcount
www.britastro.org/dark-skies/starcount

With thanks to Darren Baskill of the Dept of Physics and Astronomy at the University of Sussex, whose article on this starcount forms the basis of this report.

Anne Urquhart-Potts

For your Library

Cosmic Challenge: The Ultimate Observing List for Amateurs. Philip S Harrington. ISBN9780521899369 £27.50 (US\$45.00) hardback. Cambridge University Press.

Phillip Harrington is a highly respected observer who has previously published eight books and is a contributing editor for the respected monthly American magazine "Astronomy" where he has authored the magazine's monthly "Binocular Universe Column". He thus has the perfect credentials to write "Cosmic Challenge". In this beautifully illustrated book he provides 187 challenges to the observer to use their eyes, binoculars or telescopes to view an eclectic mix of astronomical objects. As well as the many well known celestial targets such as those in the Messier Catalogue, over 400 pages list many objects that are omitted from the standard works. This has given the reviewer a real encouragement to get out and use his or her telescope to rise up to the challenges that are clearly presented with detailed visual descriptions, finder charts and illustrations.

Some of the challenges really are a challenge! For example, the 14th naked eye challenge is Barnard's Loop – a ghostly arc of nebulosity that lies on the eastern side of the constellation Orion. The reviewer has never even dreamt of observing this, and even the author admits that this is one of the greatest naked eye challenges there is. Harrington points out that it has been seen many times with binoculars or a small telescope and that claims of seeing it with the naked eye are often the result of observing a faint string of stars that trace out a similar arc. Another challenge that the reviewer has never managed to achieve with binoculars, let alone without, is NGC 7000, The North American Nebula that lies a little to the east of the Star Deneb, Alpha Cygni. This is not for want of trying! Perhaps it is a slight relief that challenge 11 is M31, the Andromeda Galaxy, and challenge 13 is M45, the Pleiades Cluster – but then, how many stars can you see in the cluster? The Globular cluster M13 in Hercules is an easy binocular object but quite a naked eye challenge with its magnitude of +5.8.

A point that Harrington makes very clear is that it is the level of light pollution both from the Moon and the ground and the transparency of the atmosphere that are the major factors in attempting to achieve many of these challenges. The reviewer totally endorses this: a fact that was brought home to him recently when he became the proud owner of an excellent 12 inch telescope. On what appeared to be a reasonably transparent night in his home town he expected to easily see the face-on spiral, M33 in Triangulum. Despite knowing precisely where to look it could not be seen. M33, along with many of the more difficult challenges in Harrington's book has a very low surface brightness and, if the sky brightness is greater than this, then it doesn't matter what size telescope you try to use you will not see it. In contrast, on a superbly dark and transparent night well away from towns or cities, it is easily seen in a small pair of binoculars. But, of course, this would not then be a challenge. M33 is listed as a naked eye challenge in Harrington's book!

The challenges include the planets Mercury and Uranus – conveniently close to Jupiter in recent months but now drawing away. Mercury is not a difficult object if you know when to look for it (Google "Night Sky" to find the reviewers monthly sky guide which will tell you when to try), whilst an 80mm telescope or 10x50 binoculars will easily pick up Uranus and with high power show that it has a turquoise

disk. But this is also a naked eye challenge!

Binocular challenges include the galaxy pair M81 and M82 in Ursa Major - easily seen by the reviewer using 15x45 image-stabilised binoculars from the dark sky park in Galloway but not from his home. Many other galaxies are included in this section such as those in Leo and the companion galaxies, M32 and M110, to M31 in Andromeda. A far more difficult binocular target is challenge 40, the California Nebula in Perseus. The reviewer would never have dreamed of attempting to see this in binoculars, but will now!

Lunar observers are catered for too with quite a number of interesting lunar features covered such as, of course, the Rupes Recta or "Straight Wall". Sir Patrick Moore is well known for saying that "Neither is it a wall, nor is it straight". Schroter's Valley is another nice object to observe when moonlight is preventing one observing the fainter deep sky objects that will be drowned out by its light.

There are then many deep sky objects that will need medium or large telescopes to observe or, perhaps cheating, a smaller scope with an integrating video camera such as the Watec 130N which effectively doubles the effective aperture of a scope. These include, for example, Copeland's Septet, and the Abell Galaxy clusters 1367 and 1656.

The thing that the reviewer likes most about this book is that it does inspire one to try harder. There are enough challenges that, given the right conditions, can be fairly easily achieved so one does not get disheartened, but then plenty to give you something to really aspire to. He has rarely enjoyed reading a book so much and suspects that it will soon become somewhat tatty and well thumbed as he will have it with when he travels to dark skies and star parties to try to improve his observing abilities. Having managed to observe Saturn in daylight with a 4 inch refractor on the morning that this review was written (an excellent go-to mount helps!), he is ready for the off! Could this book perhaps become a follow on to the "Messier Challenge"? One never knows.

Phillip Harrington is to be highly commended for writing this book which will, no doubt, become an indispensable aid to observing. You will not regret buying it!

Ian Morison
Gresham Professor of Astronomy.

European Hands-On Universe (EU-HOU) Training Session

In the context of the Lifelong Learning Programme, The EU-HOU have proposed running three training sessions in France, at the Universie Pierre et Marie Curie in Paris.

The date of the session is the 6th to the 10th of June 2011, and the deadline for applications for funding and registration is the 14th January 2011. Details of how to apply to attend this workshop and how to apply for funding are to be found on the EU-HOU website:

www.euhou.net/index.php?

[option=com_content&task=view&id=237&Itemid=184](http://www.euhou.net/index.php?option=com_content&task=view&id=237&Itemid=184)

The UK national agency for the Comenius project is the British Council. The funding which you could apply for in respect of this course is the "in-service training" fund and information on this can be found at ;

www.britishcouncil.org/comenius-professional-development-courses.htm

It is expected that up to six UK teachers will be chosen by the organisers to attend each workshop.

The UK's EU-HOU representative is Sarah Roberts:

sarah.roberts@faulkes-telescope.com

Educational Resources from the Faulkes Telescope

There are a large number of factsheets, activities and educational projects on the Faulkes Telescope website and a suite of resources including student question sheets and teachers' answer sheets. These are written by Sarah Roberts. Topics covered include:

Factsheets:

Instrumentation: The 2m Faulkes Telescope, CCD's, Filters

Astronomical Sites: Haleakala, Siding Spring

Astronomical Techniques: Gravitational Microlensing

Astronomical Objects: Extrasolar Planets, Comets, Asteroids, Dwarf Planets.

Activities:

Solar System (Asteroids, Comets and Earth in Space)

Stars

Galaxies

There is sure to be something of use to you here - take a look at the website:

<http://resources.faulkes-telescope.com/>

Sky Diary Spring 2011

We start the New Year 2011 with the Earth at perihelion (closest to the Sun) on the 3rd of January. At this point the Earth will be at a distance of 0.9822 astronomical units from our local star. Following that on the morning of the 4th January we will wake up to a partial eclipse of the Sun. Unfortunately the event will already be in full swing by sunrise and we will have missed the mid eclipse. The Sun rises

	New Moon	First Quarter	Full Moon	Last Quarter
January	5	12	19	26
February	3	10	17	24
March	4	12	19	26

at 08:27 and there will be an hour left of the partial eclipse. If you wish to take a photo of this rare event you can initially just use a telephoto lens with a heavy neutral density filter. Once the Sun starts to rise and the brightness increases it is important to use a good solar filter.

Always protect your eyes from damage and never look directly through any telescope or binoculars at the Sun unless they are fitted with the correct filters.

For the first half of January Mercury can be spotted just before sunrise. Look towards the south east and make sure you have a good view as it will only be 6.5° above the horizon. You will have around 40 minutes to catch a glimpse this elusive planet in Ophiuchus. On New Year's Day the Moon will lie to the right and above of Mercury. Like Mercury, Venus is also visible in the morning sky.

Look south-south east to find Venus in Libra at around 20° altitude.

Throughout January Jupiter sets earlier and earlier. At the start of the month it is better to view, as it sets at midnight, but by the end of the month it will set by 21:30.

As it moves through Pisces it will be in conjunction with Uranus by half a degree on the 4th at 15:00. On the 10th at 11:00 the Moon and Jupiter will be 5.5° apart.

Saturn is improving as an object, low in the south east in

	January 15		February 15		March 15	
	Rise	Set	Rise	Set	Rise	Set
Sun	08:00	16:20	07:15	17:15	06:16	18:04
Mercury	06:35	14:30	07:15	16:21	06:37	19:38
Venus	04:25	13:15	05:07	13:23	05:04	14:22
Mars	08:24	16:37	07:19	16:55	06:09	17:12
Jupiter	10:23	22:15	08:30	20:47	06:51	19:34
Saturn	23:45	11:11	21:41	09:10	19:42	07:18
Uranus	10:18	22:08	08:18	20:14	05:36	15:37
Neptune	09:24	19:16	07:24	17:21	05:36	15:37
Moon	12:01	03:52	12:31	05:18	12:40	03:47

Data for other venues and dates can be estimated from this (and the Moon phase) table.

the early hours of the morning, and on the 5th at 00:20 is 8° north of the Moon.

The maximum of the Quadrantid meteor shower has a very short and dramatic peak on the 3rd/4th with estimated rates of 100 or more in ideal conditions. This year the Moon is New on the 4th which make this a fantastic opportunity.

February is in stark contrast to the busy January. Besides Saturn all the planets are in hiding in conjunction except for Jupiter that just sets too early to be observed well. Saturn is now opening up its rings once more by pointing its north pole at us. We can see the rings tilted at 10°.

On the 21st February at 10:00 Saturn is 9° north of the Moon. This is almost as far apart these two objects can get from each other. You can simply look at Saturn through binoculars to identify it as a planet. However if you have access to one, it is worth viewing Saturn through a powerful telescope and spending time getting some digital images. Saturn crosses the meridian at 04:35 on the 1st and at 02:42 on the 31st.

The Aurigid meteor shower can be seen between the 6th and the 9th February with a broad peak. The Moon will appear as a crescent and will set early so under good conditions the rate will be around 10 per hour.

Moving to March we reach the Spring Equinox. This occurs on the 20th of March with the Sun crossing the celestial equator at 17:30. We then put our clocks forward on the 27th to British Summer Time.

March also sees the closest approach of the Moon to the Earth. On the 19th it will be 356,577km away. The planets are back, with Mercury in the west as a superb evening target. If you need help finding it then it is right next to the more obvious Jupiter. Venus is low in the south east and very bright in the mornings. And of course Saturn is still the number one object as it is close to opposition as it sits in Virgo.

James O'Neill

Footnote: Following on from James' snippet last issue about UK-ESERO, they are asking teachers and lecturers to fill in a survey about their experiences of information and resources related to space education. For a copy of the questionnaire go to the ESERO website:

www.esero.org.uk