Gnomon

Newsletter of the Association of Astronomy Education

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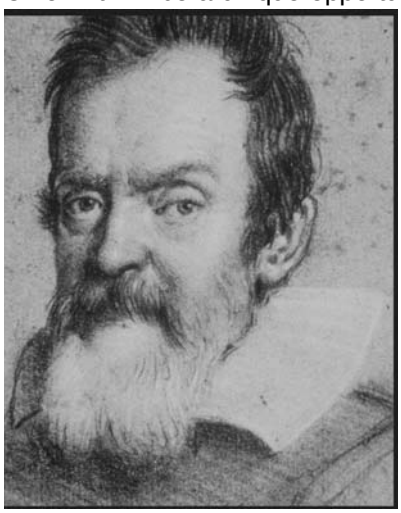
International Year of Astronomy 2009 presents important education opportunities

A major event to promote the role of astronomy in human culture worldwide the International Year of Astronomy 2009 has been announced by the International Astronomical Union. It will be a unique opportunity for astronomy education at all levels. The date has been chosen to celebrate the 400th anniversary of the first use (1609) of astronomical telescopes by Galileo and others that opened new windows on the universe. In addition, 2009 marks the 40th anniversary of the first lunar landing.



Galileo Galilei, 1564-1642, as one of the first empirical scientists and one of the first to realise the new capabilities of the newly improved device, the telescope, first used, and made, by Galileo in 1609.

One of the first statements on the planned celebration by the IAU is very descriptive and encouraging:

"IYA2009 will be a global celebration of astronomy and its contributions to society and culture, stimulating worldwide interest not only in astronomy, but in science in general, with a particular slant towards young people.

IYA2009 will mark the monumental leap forward that followed Galileo's first use of the telescope for astronomical observations, and portray astronomy as a peaceful global scientific endeavour that unites astronomers in an international, multicultural family of scientists working together to find answers to some of the most fundamental questions that humankind has ever asked".

The IAU will coordinate selected international events and will liaise with national representatives from more than 100 countries. IYA2009 activities in the UK will follow under the umbrella of the Royal Astronomical Society. So far, there are around 20 UK institutions collaborating in the early stages of the programme, the AAE being one of them.

There was a kick-off meeting at the Royal Astronomical Society in London on November 2006 from ☞ **page 2**

Comet McNaught makes a very big impression

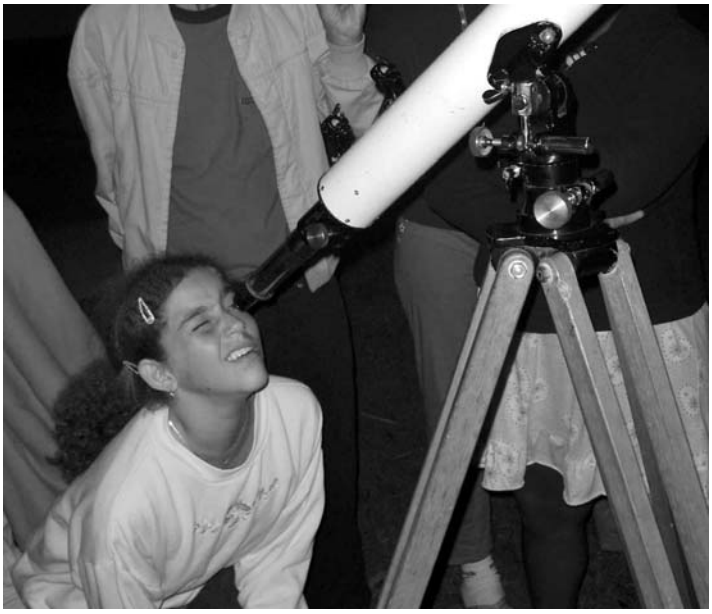
New Zealand astronomer Bill Allen wrote to the Editor soon after comet McNaught had caused such a stir in the southern hemisphere (see page 6).. Apparently Spode's Law works well even south of the equator and the comet sightings were made tricky by weather conditions, but everyone had a good view in the end ("Mutter mutter mutter" from most of us in the north! - Ed.) Bill's friend Noel Munford took the photograph on the left from New Zealand, and in reply to my letter asking his permission to publish it in* Gnomon *generously said "Yes" and added "Regards, and yes we do feel like we got one up on you." Thanks a bunch Noel!

Noel Munford: 2007

Dr. Francisco Diego: 2007

Bill wrote "Comet McNaught was very impressive, but we had bad weather and managed to see it only on three occasions, see photo attached which was taken by a colleague in Palmerston North. I got up early one morning, as you do when you are over 65, and saw the comet in the eastern sky. Although the nucleus was below the horizon the tail stretched in an arc at least 50 degrees long, all very impressive."

But they didn't get it all their own way, it is clear, as can be seen by the excellent photos sent to* Gnomon *by Francisco Diego, one of which is shown here, taken in Ruskin Park, South London, on January 10.



Small telescopes can be used for public observation sessions, one of the best ways to inspire young and old alike. (Don't forget the star diagonal!) Refractors (above) and reflectors (right) are interesting to compare in use

☞ which a number of important objectives for the UK were established. These include the plan for a major national launch with wide press coverage, probably at the Association for Science Education Conference.

In addition, astronomy days will be organised at ASE conferences in 2008, 2009 and 2010.

The public participation in astronomy will be promoted with the use of portable telescopes by amateur groups in public places and schools. It may also be possible to use the robotic telescopes in special events.

Other proposals include the issue of commemorative postage stamps, and that the public perception could be enhanced by capitalising on the Moon landings anniversary in June.

National Astronomy Week will take place in the summer of 2009, when the theme will be the Moon and the observations by Thomas Harriot. Other events that will heighten public awareness include the long total solar eclipse that will be visible from China. Solar activity is on the increase, so there will be good opportunities for solar observing. Although from the UK, Jupiter will be very low in the southern sky, Saturn will still be in Leo, and its rings will be getting very "thin" as they approach the edge-on aspect.

It is also intended to promote astronomy at UK science festivals and alternative events such as the Glastonbury Festival, and even the BBC Promenade Concerts, (which could include, for example, Gustav Holst's famous suite *The Planets*).

These are just draft ideas to generate additional suggestions, so please think about this and send your own thoughts and suggestions to Robert Massey: (📻 ***rm@ras.org.uk***) or Francisco Diego (⌨ ***fd@star.ucl.ac.uk***).

The IAU is organising the conference "Communicating Astronomy with the Public" (CAP2007) to take place in October 2007 in Athens. The AAE will be represented there with one or two contributions.

For more information please go to

💻**www.astronomy2009.org, or search for IYA2009 at the RAS website** 💻***www.ras.org.uk***

Francisco Diego

Space 2057— The RAS Schools Newspaper Competition

The exploration of space by artificial satellite and space vehicles began 50 years ago. To mark this milestone in space exploration the Royal Astronomical Society's Newspaper Competition for Schools asks students to imagine what new advances will be made in the next half century.

The past fifty years have shown a tremendous transformation from the tiny unmanned spacecraft Sputnik I, launched in 1957, to the Moon landings, the Space Shuttle, the Hubble Space Telescope through to the latest 21st Century space probes. Students' imagination will be tested to the limit in projecting forward to the year 2057 in their competition entries.

The competition is divided into two categories – the Newspaper competition itself and the Feature Article competition.

The **Newspaper Competition** is open to younger ☞

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All communications (except those to the Editor) should be addressed to:
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The Royal Astronomical Society
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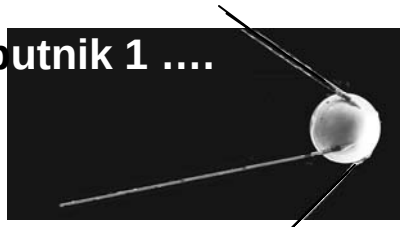
Publication Dates:
These are at the equinoxes and the solstices, that is four times a year. Copy deadlines are six weeks before these dates.



☞ students (7-14 years). It asks them to produce a small newspaper containing lead stories about the latest developments in space exploration in the year 2057.

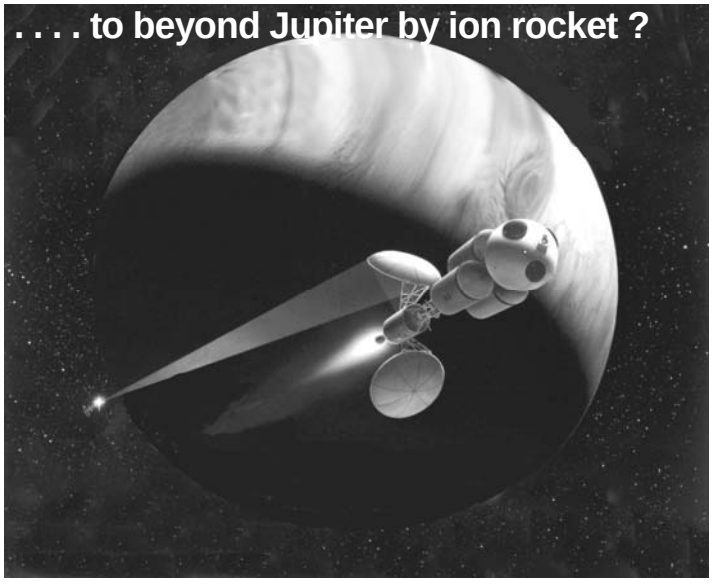
The **Feature Article Competition** is open to older students (14-19 years). Students are asked to write a *New Scientist* style article about space exploration in the second half of the 21st century in this section.

The winning entries in each age group will win a telescope for their school, along with individual prizes for students and additional prizes for runners up. In addition, prizes can be presented to the winning schools by a Fellow of the Royal Astronomical Society.

A winning *Newspaper entry* is likely to contain good, relevant, witty headlines and lead stories, reports on the latest developments in space exploration by the year 2057, details of the latest discoveries of the space exploration programme by 2057. It could also include an illustration showing some scientific aspect of space exploration in 2057, a cartoon, or an original poem about the consequences of space exploration in 2057 The reactions of people in the street.

Some appropriate prizes are offered for the best in each category

A winning *Feature Article* entry is also likely to include many of the points mentioned above. The article must not be more than 2000 words long, must contain diagrams or images and should be in the style of magazines such as *Astronomy Now* or *New Scientist*. Entries in this category are also expected to include some of the technological problems of space exploration which will have been overcome by 2057. It will explain scientific discoveries which may have been made by 2057 as a result of continuing space exploration, and the social and economic implications of continuing with a high cost programme such as space exploration.



A copy of the leaflet giving full details of the competition is enclosed with this issue of *Gnomon* and additional copies can be downloaded from the Education page of the Royal Astronomical Society website: **www.ras.org.uk.**

Schools wishing to register for this year's competition can do so by e-mail at: **newspaper@ras.org.uk.**

Entries need to be submitted by July 30th, so that the winners can be announced at the start of the new school year.

Julien King
Chair of Education Committee, RAS

Want to run a planetarium business?

A complete mobile planetarium business, with a 5m diameter inflatable dome blower and controller, a specially designed and built projector (of the Goto or Spitz type), and a wide range of accessories including daylight/sunset projection, celestial scales, planets, Milky Way and automatic lunar phase projectors etc. slides, CDs, and a complete, but not quite finished new 5m spare dome with its own blower and controller is available for sale as a complete package.

It represents a complete outfit for anyone thinking of starting a mobile planetarium business, at a price less than half that of the cheapest alternatives - not even counting the spare dome!

Please contact the editor for further details (see the bottom of previous page for contact information).

Observations

The news in this issue has a strong theme (well, actually two, if you count Comet McNaught) of various initiatives to stimulate public and educational interest and participation in astronomy. Although the work on the planning the International Year of Astronomy 2009 has only relatively recently begun, it does seem to be overshadowed by the very thorough commitment made in Scotland for their national year of astronomy, that has just got underway.

Forgiving the Scots for hijacking the term "Dark Skies", for the name of their project might be difficult for many of those who have been working so tirelessly and long to establish public awareness of the cost, financial, environmental, educational and aesthetic, of absurd outdoor lighting design and usage. The title "Dark Sky Scotland", is, as a result, somewhat misleading as it seems to imply the need for Scotland to reduce light pollution to get its skies dark, whereas it actually means almost the opposite. What it therefore implies with that label is "Who needs a campaign, we've already got dark skies!" which is a bit McNaughty of them. A typical English (or in my case, Cornish) response might well be to point out that Scottish skies may indeed be dark, but who can tell through all those rain clouds?

As well as taking over their own government (and that of the UK, pretty much) they have now grabbed the initiative on campaigns for public education in astronomy. Well, see if I care! I shall have made so many readers cross with my comments that the letters and protests will be pouring in, and that will solve the ever-increasing difficulty of finding enough copy to fill *Gnomon.* Without the expected tirade of protest I expect from north of the border, the next issue will probably be a single sheet of A5. (That might be an improvement).

The Editor

Dark Skies in Scotland?

In mid January, the Deputy First Minister of the Scottish Assembly, Nicol Stephen, launched “Dark Sky Scotland”, Scotland's first nationwide programme of public and educational astronomy events. The initiative is described in a recent Royal Observatory Edinburgh Press Release.

The dark skies of rural Scotland, free from urban light pollution, are among the best in Europe offering stunning views of the stars and planets. Led by the Royal Observatory Edinburgh Visitor Centre, *Dark Sky Scotland* events will take place from February 2007 to Spring 2008.

Family events are being organised with the Forestry Commission Scotland - the national forest estate and the Commission's accessible visitor facilities being ideal locations from which to explore the skies. Careers Scotland is coordinating a programme of workshops for teachers to help open the eyes of pupils and parents to the night sky and the wider world of science and technology. The events will be run by a specially trained team of professional and amateur astronomers, students and teachers led by the Royal Observatory Edinburgh and the Glasgow Science Centre - which have a wealth of experience in stargazing and planetarium shows.

SCIENCE NATION

Deputy First Minister Nicol Stephen said: "Scotland is a ‘science nation’ and we spend about £4 million every year on bringing science to the people. I am pleased to be able to support Dark Sky Scotland and hope that it will help grow Scotland's astronomy and space science sector."

Dan Hillier, Dark Sky Scotland project leader from the Royal Observatory Edinburgh, added "The night sky can be enjoyed from our doorsteps as well as from the huge areas of dark sky in Scotland. There are spectacular things to see with just the naked eye or simple binoculars as well as with telescopes. The Dark Sky Scotland family events will give everyone, from children to grandparents, the chance to get out there to spot the constellations, marvel at the Milky Way or count the craters on the Moon. The highlight of this winter for many will be seeing the beautiful rings of Saturn though a telescope. We will also be showing how Scotland's scientists and engineers are at the forefront of exploring the wonders of the universe such as the search for dark matter and life on other planets.”

“These family events will take place all over Scotland. When the Dark Sky Scotland team visits an area, we will also run workshops for teachers, community groups and tourism operators to enable them to run similar activities in the future, so that astronomy becomes a bigger part of life in Scotland."

Bob McIntosh, Director, Forestry Commission Scotland, said; "Forestry Commission Scotland is delighted to be a key partner in Dark Sky Scotland, as part of our programme to celebrate Scotland's Year of Highland Culture. Scotland's national forest estate, owned by Ministers and managed by the Commission, has some of the best light-free locations in the world from which to observe the night sky. We will therefore be hosting a number of different stargazing events across the country throughout the year. Forests and woodland are excellent outdoor classrooms to promote environmental awareness and improve our health and well-being. Now, Dark Sky Scotland will provide young and old with an exciting new reason to visit and explore Scotland's diverse national forest estate."

Sandra Lowson, Careers Scotland, explained "Scotland needs a supply of young engineers, scientists and technologists to sustain its economy and for growth in the future. We are supporting the Dark Sky Scotland events as a way of encouraging children and parents to think about these types of careers."

Professor John Brown, Astronomer Royal for Scotland said "Scotland is home to world-leading astronomical research and technology. It also has many very active local astronomy groups. It is great to see the professionals and amateurs come together to promote the special value of our dark skies and science in general".

Each event will include family activities and training workshops. Details of each event can be found at

www.darkskyscotland.org.uk.

Further dates, up to Spring 2008, will be added to this website.

The project aims are:

- to inspire the public, pupils, teachers and parents through the night sky and astronomy & space science;
- encourage positive attitudes toward science & technology subjects & careers;
- develop dark sky tourism to engage people with astronomy & space science;
- develop the network of people able to run future events;
- create partnerships of organisations that will support future activities.

The programme will involve some 35 events, including three main types. Family weekend events will combine stargazing sessions with daytime activities including portable planetarium shows, rocks from space and comet-making demonstrations. Workshops for teachers will show how to run naked-eye observing session for pupils and parents, and how to use robotic telescopes such as the Faulkes Telescope in Hawaii, to take images of deep space objects like galaxies and nebula. Workshops for tourism operators and community groups will show how naked eye observing can become part of community events and the services provided by accommodation operators and tour guides.

PROJECT FUNDING

The project has funding to the value of £160,000. Royal Observatory Edinburgh Visitor Centre led the piloting, development and fundraising. Now managing the project and developing the Dark Sky Scotland Team to run events.

Forestry Commission Scotland provided £10,000 funding plus in-kind support including organising local events in or near the national forest estate, as part of the FCS 'Touchwood' suite of projects to celebrate Scotland's Year of Highland Culture in 2007

Careers Scotland provided £25,000 funding plus in-kind support including organisation of teacher workshops, as part of STEMS, (the Science & Technology Matters programme.)

The Particle Physics and Astronomy Research Council is providing £35,000 funding directly to the project and with indirect support through many of the students and scientists involved.

Other major funding is being made by the Scottish Executive through grants of £47,000 to ROE and GSC from its new Science and Society programme; the Highlands & Island Enterprise with £15,000 from its programmes to strengthen communities and skills.

The Highland Council's Highland Constellation project is part of H2007 and which sprang out of the development work for DSS. The Royal Observatory Visitor Centre is open throughout the year for pre-booked group visits and special events.

The things people ask!

Joshi, from Amsterdam asked: *Hello AAE. I've very recently purchased my first telescope. Now this morning I spotted something peculiar in the eastern sky. It looked like two, or three (I couldn't magnify enough to see exactly how many) stars, revolving around each other. I have been looking to find a definition of this on the internet, but the only thing I've come up with is that it might be eclipsing binary stars. But, reading further about these, I understand they take two days to 'revolve', is that correct? The thing I spotted revolved very fast, like one of those animations of an atom, only closer together. Could you please tell me what this is? I am absolutely flabbergasted! Thanks very much, Joshi*

Dear Joshi: Congratulations on your new telescope. Using it and understanding how things appear in the little circular field of view and relating them to what you see in the sky with the naked eye takes some time. I think this is part of the puzzle that you describe. Anything starlike that moves fast in the sky is a plane, a satellite or a weather balloon. All have definite straight paths.

Through the telescope, a bright star and sometimes a planet may look like it is 'boiling' when it is very close to the horizon. I have seen it myself many times and it gives the impression of rotating lights. This is nothing to do with the star or planet, but is due to a high degree of turbulence in our atmosphere which distorts the images very rapidly. You are right about double stars, but they usually take years, not days, to show change of positions around each other.

David Rousso, from Philadelphia, wrote: *I would like to share, my honest observations from the past month of December. I noticed the constellations were reasonably close to their normal positions for this time of year. However, I did notice something strange. The constellations of Orion and Canis Major, just above the horizon in the South, should have been slanted in a clockwise manner, about 20 degrees for Orion and a little more for Canis Major, for most of the night. Instead I found they were slanted in a counterclockwise fashion, and to the extreme. The best example I can give is to take the star Sirius, which is in Canis Major and is it's brightest star, and find the fainter star just to the right. If you drew a line, starting with Sirius and connecting it to it's neighbor star just to the right, it should then continue and hit the ground. But instead it goes up into the sky. Thanks for looking into this.*

Dear David: It looks to me that you should follow the positions of all these constellations for several hours along the night as they seem to rotate clockwise around the southern horizon. You can replicate this more comfortably in your computer by downloading a sky simulation program like Stellarium. I use this to visualise many other strange effects that sometimes confuse me.

Brad Mills from Bakersfield, California, asked: *What happens when the readily available close by supply of material falling into a black hole runs out. Do they remain a black hole or do they explode, implode or remain a black hole just not growing larger or more powerful?*

Dear Brad: Yes, they would remain as black holes. Black holes do not necessarily need to feed all the time, and probably most of them do not anyway. However, please have a search for Hawking radiation to have an idea of how bizarre the whole thing is. No evidence has been detected so far, but the theory seems quite robust.

Thomas Findlay from Prestwick asked: *Having heard that gamma rays are the nuclei of atoms that have had their electrons stripped off, I am wondering how accurate this is, and therefore about the varieties of types of gamma rays there may be? Although I appreciate the vast majority of bare nuclei (protons only?) may come from hydrogen atoms as a single particle, dying stars emitting gamma ray bursts would surely be throwing off other matter as well, and therefore other number combinations of protons?*

Dear Thomas: Gamma rays are just that: rays of energy, like light, not proper particles. You seem to have a big confusion. Nuclei of atoms are made out of proper particles like protons and neutrons. Any modification in the number of protons or neutrons in a given nucleus (which may happen by nuclear fusion or fission) may produce gamma rays. I would suggest that you read a bit of this on the Wikipedia website before you go any further about dying stars. Then come back to me with more specific questions. One step at a time. Make sure you first understand nuclear structure and the processes of fusion and fission and how these produce gamma rays.

Thomas Pitts asked: *How distinct is the terminator if you were standing on the Moon? How quickly does the regolith heat up and cool down as the terminator passes? Thanks.*

Dear Thomas: It depends where you stand; a plain sandy area or a mountain range, much the same as it does on Earth. As regards the surface temperature, I found a very good article with interesting curves at:

www.lpi.usra.edu/meetings/LPSC99/pdf/1799.pdf

You can see that the heating after sunrise is quite fast, while cooling down after sunset takes longer. Temperatures range from -173°C at midnight to 120°C at noon! A total lunar eclipse produces much stronger temperature gradients.

Stuart, from Peterborough wrote: *My 10 year old son has asked me a question I do not know the answer to, can you help? Is it true that the Earth (or in fact all planets) moves closer to the Sun by 1mm each year overall? So that in billions of years that the Earth will become) a fuel pod for the Sun?*

Dear Stuart: Quite a thing to ask for a 10-year old! I do not know where he got that from. Do you? Orbits of planets are more or less stable but subject to may disturbances between themselves. It is very unlikely that there is a definite trend. Certainly 1mm per year is very slow and I guess impossible to measure. I am curious about the origin of this information, please let me know if you have more.

Ellen, from New York City, asked: *Can you tell me what the distance (or rather, the range of distances) between Mars and the Earth is? Or can you tell me where I can find this information?*

Dear Ellen: Mars can be as far as 399Mkm or as close as 56Mkm. You can find this by doing a Google search for maximum and minimum distance to Mars. To know the distance to Mars at any time go to **aa.usno.navy.mil/** and click on "data services". Go down the page to "Synthetic Views of the Earth and Solar System Bodies" and click on "Apparent Disk of Solar System Object". Then go to "object" and choose Mars. Enter the desired date and click on "make image". Finally wait until you can take the value of the diameter that appears at the bottom of the displayed image of Mars for that date. You can divide 1393 (which is a constant only for Mars) by the angular diameter in arcseconds to give the distance in millions of kilometres. Say for example, it was 4.4" today, then 1393/4.4 = 316.6 million kilometres. A bit tortuous, but I could not find a website that gives you the distance straight away for any date. I am sure there may be a few, but this will do if you are patient.

Best regards

Francisco Diego, AAE Query line

Letter from Down Under

While astronomers take pride in being able to predict phenomena such as total solar eclipses for millennia into the future, it is often the unexpected that puts on the best show of all. Bright comets visible to the naked eye come around once every decade or so, but with the exception of Comet Halley, these are nearly all first-time visitors to the inner solar system, so we do not usually have more than a few months warning that they are on their way.

Comets visible in the daytime are even rarer – not since October 1965, when the sun-grazing Comet Ikeya-Seki reached magnitude –10, has a comet been visible while the Sun was still up. While Comets Hale-Bopp and Hyakutake put on a superb double act in 1996 and 1997, they were never bright enough to be seen in the daytime (though both your correspondent and Editor could have seen it from Mongolia during the 1997 March 9 total solar eclipse if it hadn't been snowing at the time!).

Prior to 2007, astronomer Rob McNaught's main claim to fame was unwittingly capturing a photo of Supernova 1987A the night before it was officially discovered by Ian Shelton, Oscar Duhalde, and Albert Jones (an indignity he shares with your correspondent). But now his name is associated with the first great comet of the 21st century. Since 2004, Rob has been using the refurbished Uppsala 0.5m Schmidt Telescope at Siding Spring Observatory for a NASA-funded survey for near-Earth objects (NEOs), and the so-called "Potentially Hazardous Asteroids" in particular that may pose a threat to life on Earth if our paths ever crossed.

Image of comet McNaught obtained by Stuart Ryder on 2007 January 20, using a Canon IXUS II set to ASA 200 and 15s exposure.

In addition to finding dozens of near-Earth objects, Rob's survey has turned up almost 30 new comets, including the innocuously named C/2006 P1, first spotted in CCD images on 7 August 2006. Observations on subsequent nights allowed a preliminary orbit to be calculated, which showed that it would reach perihelion (closest to the Sun) inside the orbit of Mercury in mid-January 2007, making it potentially quite bright as it emerged from the Sun's glare. To make matters even more interesting, models for the amount of forward scattering by dust in the comet suggested this may amplify its apparent brightness by a couple of magnitudes for a few days after perihelion. Indeed, using the finder scope attached to the side of the Uppsala telescope, Rob was able to see the eponymously-named comet at midday on January 9.

Around perihelion, the best views were to be had by the armada of spacecraft orbiting the Sun just ahead of or behind the Earth, including the Solar and Heliospheric Observatory (SOHO). Its LASCO camera has witnessed many a sungrazing comet, but nothing like McNaught – the delicate sensor tuned to capture the subtle wisps of a coronal mass ejection was dazzled as the comet arced through its field of view.

It was not until January 15, when the comet was 7° above and setting 40 minutes after the Sun, that my wife and I set out to try and see it from here in Sydney. At this time of year, an otherwise clear view of sunset from our apartment balcony is blocked by a large gum tree, so we drove a short distance away to a street with an elevated and unobstructed view of the southwest horizon. As we waited for sunset with our telescope set out on the footpath, several locals who had heard about the comet on the news broadcasts came out to see what the fuss was about.

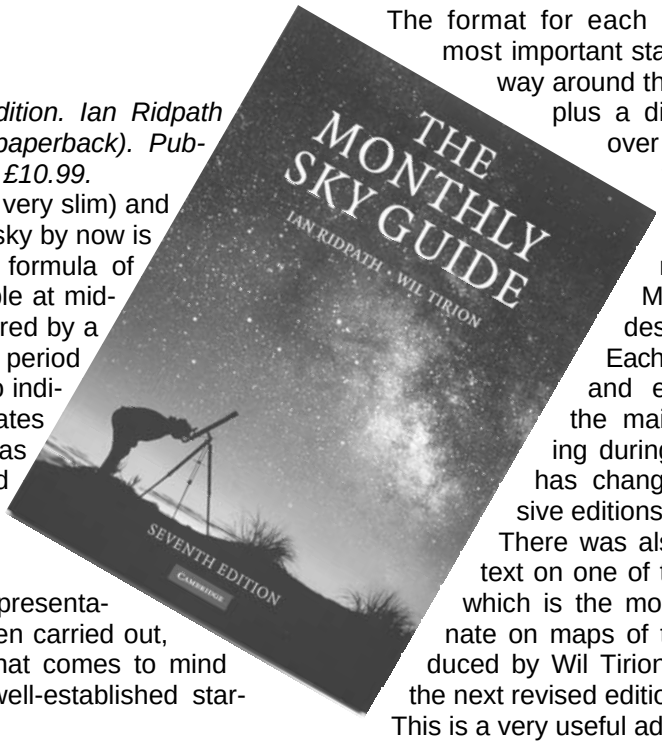
As soon as the Sun set, I started scanning the horizon with binoculars, but several ridges of low cloud, coupled with the haze from bushfires in the state of Victoria made me doubtful of spotting it. Nevertheless, within 10 minutes it emerged from behind the cloud, and was visible to the naked eye even before Venus. Through our 80 mm f/6 apochromat refractor, the nucleus was bright and compact, nestled within a bullet-shaped coma. Within 10 minutes the comet was lost in the cloud and haze, but the following night it was higher in the sky and even more impressive. The crowd had grown too, and although some were disappointed that the comet didn't blaze across the sky in a few seconds like they had imagined, many were impressed by the sheer fact they could see the comet and a few degrees of tail against a still bright and orange sky.

The next two nights were cloudy, but by Friday 19 January we did not even have to leave our balcony to see the comet almost 20° up. Despite looking through the cumulative light pollution of 4 million inhabitants, we could see, and even shoot video of the comet and nearly 5° of tail. Imagine what it must be like from a dark sky! That Saturday we were headed down to Canberra anyway for a friend's birthday party, which fortunately took place in the southern outskirts of the city, affording us a dark view to the west. What I witnessed that evening will live with me forever. At first it took some finding to locate the comet through a gap in the trees. But as the sky darkened, Comet McNaught was revealed to us in its full glory – a bright yellow nucleus, from which some 30° of dust tail arched away to the north and east. The southern edge of the tail was sharper and straighter, marking the ion tail. Remarkably, we could make out fan-like striations in the dust tail without optical aid, while the view in binoculars was stunning. Even after the head of the comet had set, the tail remained like a ghostly aurora, only more static and lacking in colour. I empathise with those of you in the north, for many of whom this "headless comet" was all that you got to see! Now I know that those sketches of great comets in the 19th century were maybe not so fanciful after all. Comet McNaught was one of those once-in-a-lifetime events, and I feel very privileged to have witnessed it. Though there have been many outstanding photos of it published, the best I have seen are those by Rob himself – be sure to check out

http://msowww.anu.edu.au/~rmn/C2006P1.htm

Stuart Ryder
sdr@aaoepp.aao.gov.au

For your library



The Monthly Sky Guide. Seventh Edition. Ian Ridpath and Wil Tirion. ISBN 0521684358 (paperback). Published by Cambridge University Press. £10.99.

This book (not quite a booklet, though very slim) and its month by month guide to the night sky by now is getting very familiar. It has a trusty formula of monthly key maps showing stars visible at midnight, with planets and the Moon covered by a table updating their positions over the period 2007 to 2011 inclusive. The maps also indicate other times of the day and dates when the same aspects of the sky as shown on the map will be relevant, and the maps are extended north and south to indicate stars visible at latitudes from 60° to 30° north.

Minor improvements in the maps' presentation and revisions to the text have been carried out, but "if it ain't bust, don't fix it!" is what comes to mind when looking through this by now well-established star-gazers' aid.

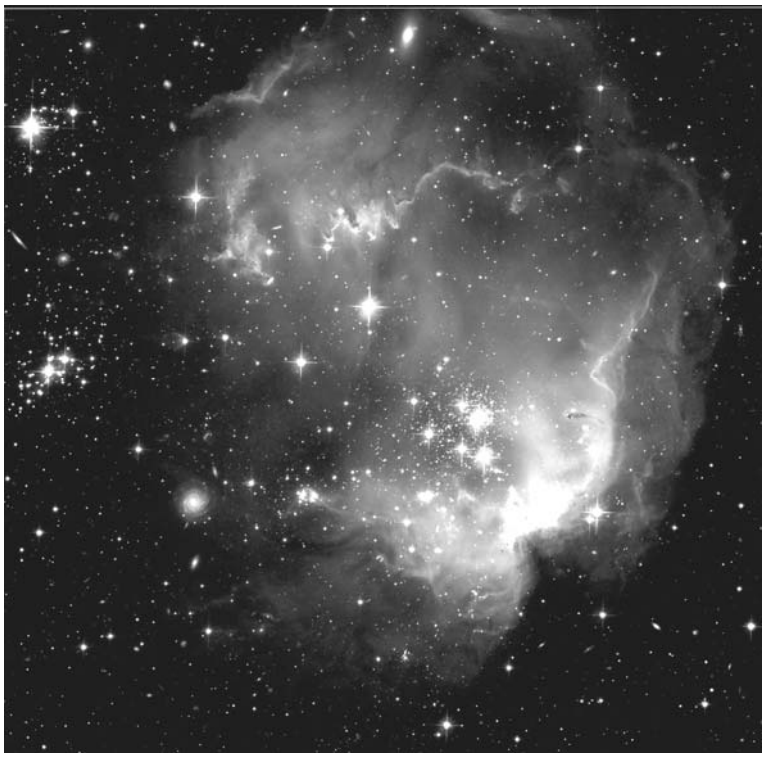
The format for each month is to highlight the most important stars for starting to find one's way around the sky at the specified time, plus a diary of planetary positions over the five years covered by the new edition, and notes on any eclipses that occur during the same period on the featured month. Meteor events are similarly described.

Each month has an informative and entertaining description of the main constellations culminating during the month, although this has changes little over the successive editions of the book.

There was also a bad corruption of the text on one of the whole-page star maps, which is the more noticeable and unfortunate on maps of the usual high quality produced by Wil Tirion. It will be a long wait for the next revised edition, so this is a pity.

This is a very useful addition to the school library.

Richard Knox



New stars shed light on the past

This magnificent image, from the Hubble Space Telescope, depicts bright blue newly formed stars that are blowing a cavity in the centre of a fascinating star-forming region known as N90, one of the star-forming regions in the Small Magellanic Cloud. Here is a star forming processes in an environment that is very different from that in the Milky Way. A satellite galaxy of the Milky Way, N90 is about 200,000 light-years distant. Its proximity (!) makes it an exceptional laboratory to perform in-depth studies of star formation processes and their evolution in an environment close to that in the early universe. Dwarf galaxies such as the Small Magellanic Cloud, with small numbers of stars compared with the Milky Way, are considered to be the primitive building blocks of larger galaxies. Star formation within this dwarf galaxy is particularly interesting because its primitive nature means that it lacks a large percentage of the heavier elements that are forged in successive generations of stars.

Sky Diary Summer 2007

Mid May this year is blessed with the New Moon so minimising the nuisance of the twilight midnight sky. The twilight at midnight, at most British latitudes, is in fact a visible glow that moves round the horizon from somewhere near northwest as the Sun sets, through north at about midnight (which is about 1 a.m. BST) and brightens until it becomes the rising Sun somewhere near northeast on the horizon.

Moon phases for the second quarter of 2007

	New Moon	First Quarter	Full Moon	Last Quarter
April	**17**	**24**	**2**	**10**
May	**16**	**23**	**2**	**10**
June	**15**	**22**	**1**	**8**

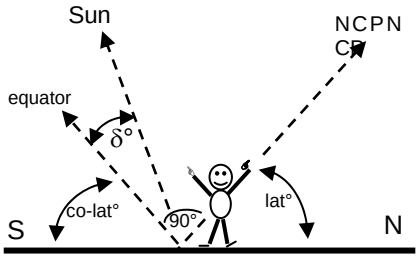
It is more of a nuisance for observers of faint objects in the sky. Most people will call it pretty dark and be quite happy to look at brighter objects for a few weeks while the Sun hangs around the northern part of the ecliptic. At his highest in the northern skies, the Sun has a celestial latitude (called "declination") of about 23½° north of the celestial equator. All this means is that the Sun will be overhead at all points along the Tropic of Cancer, latitude 23½° north, at some time during the day we call the (northern) Summer Solstice.

For those of us not living in the tropics, the Sun is *never* overhead. This simple fact will be denied by a surprising number of people. Some time in mid-ish June, ask someone "at what time is the Sun overhead today?" and ☞

☞ none of ten folk will answer “midday”. But from latitude 52° north, for example, we can work out the solstitial altitude of the noonday Sun, for that will be its very greatest altitude in the sky from that place. The altitude of the celestial pole, it can be shown by simple geometry (try it!) is equal to your latitude, and will be due north in azimuth of course. The celestial equator must be at an angular separation of 90° to the pole all along its length. It must rise at a point exactly due east on your true horizon (not the roof of the cigarette factory) and pass through its highest point due south from you, than set due west (all the same simple geometry.) So the height of the celestial equator at its highest, as it crosses your southern meridian, must be equal to your co-latitude (90-latitude)°, as is shown in the sketch. Here, the Sun’s declination is δ°, so the noon altitude is co-latitude plus declination, or a maximum for the latitude in this example of 63½°.

Rising and setting times (UT): lat.52°N; long.3°W

	April 15		May 15		June 15	
	Rise	Set	Rise	Set	Rise	Set
Sun	05h 18m	19h 07m	04h 20m	19h 57m	03h 51m	20h 32m
Mercury	05h 04m	17h 14m	04h 44m	21h 20m	05h 22m	21h 40m
Venus	06h 33m	22h 57m	06h 35m	23h 54m	07h 30m	23h 23m
Mars	04h 08m	14h 26m	02h 50m	14h 38m	15h 27m	14h 49m
Jupiter	23h 54m	07h 52m	21h 50m	05h 51m	19h 29m	03h 35m
Saturn	12h 32m	03h 42m	10h 37m	01h 45m	08h 48m	23h 43m
Uranus	04h 23m	15h 28m	02h 27m	13h 37m	00h 26m	11h 38m
Neptune	03h 33m	13h 05m	01h 36m	11h 09m	23h 31m	09h 07m



While we are about the misleading things people say about this time of the year, why do people insist on saying that “the days are drawing out” or “getting longer”? A day is 24 hours, and is little to do with the time of year! Is it just laziness that nobody says that the daylight hours are drawing out, or that the nights are getting shorter?

Jupiter is in the constellation of Ophiuchus, some 6° north-east of the red giant “rival of Mars” Antares in Scorpius. The Scorpion is arguably the most spectacular of the Zodiacal constellations to the unaided eye, and possibly the nearest rival to Orion. Perhaps this is to be expected for the creature sent by the ancient gods of mythology (with a black sense of humour) to slay the boastful hunter who claimed he could lick any beast the gods sent to destroy him! Not a smart comment with bored gods listening for something to amuse themselves with for an hour or two! The only sop to the Great Hunter was to place them both in the sky on opposite sides so that they never saw each other again, each rising as the other sets.

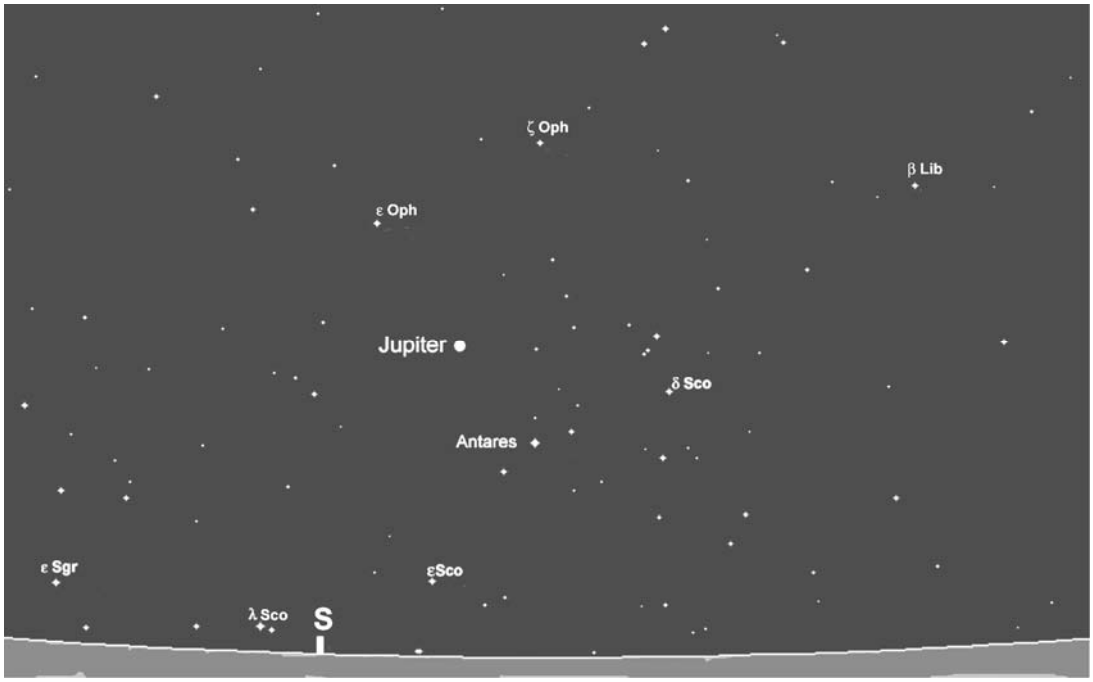
Actually, Scorpius contains only a tiny portion of the ecliptic. The large, sprawling constellation of Ophiuchus to the north of Scorpius, actually contains more of the Sun’s path through the Zodiac than the Scorpion, but this 13th constellation of the Zodiac didn’t fit in with the astrologers’ round dozen of “houses”, so to keep it clear they named it after some other thingy called “Scorpio”.

Luckily, the Scorpion is prominent in the early evening sky well after dark towards the middle of summer, when many of us if we are lucky travel to more southern latitudes for holidays at this time of the year, and so get a chance to see the entire Scorpion, right down to the sting in his tail. Actually, in theory, the tip of the sting (λSco) is above the horizon from middle UK latitudes, as shown in the star map, but in practice, of course, the tail is lost in the murk of the low altitude. When seen from even the latitude of Toronto (which, contrary to what many people think is about 10° further south than any part of Britain) the Scorpion presents an impressive sight.

The rest of the quarter is not especially interesting for events, although the Lyrid meteors reach maximum in favourably dark sky conditions around April 22-23. Mercury is always in a twilight sky, so its eastern elongation at the start of June need to deter those wishing to glimpse it in the evening sky. It reaches maximum elongation of 23° on June 2 at a declination about as far north as it can get (about 2° north of the ecliptic through the eastern side of Taurus and the western boundary of Gemini) through late May and early June. Although the evening ecliptic intersects the western horizon at the most favourable angles at the equinox, it is still well inclined for many weeks either side, so keep a look out for the elusive winged messenger. The Moon passes well to the north of Mercury on April 16 and again on May 18.

The Moon is fairly close to Saturn on May 22 and June 19.

Richard Knox



Rising in the Spring skies, possibly the most magnificent Zodiacal constellation is not easy to see in an evening sky rapidly brightening with twilight. It is not until later in the summer when the Sun is once more moving south that Scorpius is seen in a dark sky, quite early in the evenings of August. However, this view in mid May when the Scorpion culminates near midnight, amply rewards the late night observer, particularly when the magnificent Jupiter is close to his eastern claws.