

## Thomas Harriot Day at Syon House



The picture says it all. 'Thomas Harriot' (actor, Alan Cheeseman) meets 'NASA astronaut' (Greg Smye-Rumsby) in front of Syon House in Middlesex. Syon, where Harriot lived for much of his life, was the home of Harriot's patron, Henry Percy, the Ninth Earl of Northumberland, known as the Wizard Earl because of his interest in experimental science. The family still own Syon.

On Sunday, 26<sup>th</sup> July around 700 people, including many families, came to Syon Park in Middlesex for a varied programme of astronomical activities, talks, exhibitions and seventeenth century music. Lord Egremont of Petworth, a descendant of the Ninth Earl, who owns most of Harriot's astronomical papers, unveiled a memorial plaque. In the evening, Dr Allan Chapman gave an enthralling lecture on the life and times of 'the Englishman who beat Galileo'.

Four hundred years ago to the day, at nine o'clock in evening, Harriot pointed his telescope at the five day old Moon from his house in the grounds and drew what he saw through a lens with a magnification of six diameters. The resulting image became the first recorded instance of a telescopic astronomical observation, beating Galileo by several months. Since then the continuously evolving technology of the telescope has become the key to our understanding of the universe.

The Telescope400 event at Syon was a celebration of the history of the telescope from Harriot to Hubble. Above all, it celebrated Harriot's considerable achievements

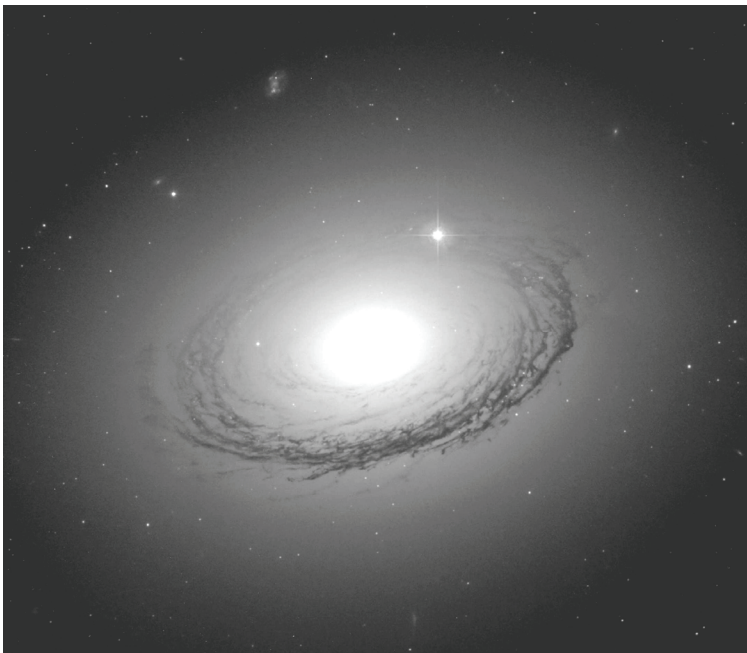
*Ancient and Modern* Photo: Tony Marshall

☞ (cont. on page2)

**URGENT! Call to a General Meeting to plan the future of the AAE - see insert**

## Is it a spiral or an elliptical?

***A recent Hubble image highlights striking swirling dust lanes and glittering globular clusters in an "oddball" galaxy NGC 7049. The NASA/ESA's Hubble Space Telescope captured this image of NGC 7049, a mysterious looking galaxy on the border between spiral and elliptical galaxies. NGC 7049 is found in the constellation of Indus, and is the brightest of a cluster of galaxies, a so-called Brightest Cluster Galaxy. Typically, such clusters are comprised of some of the oldest and most massive galaxies. They provide excellent opportunities for astronomers to study the elusive globular clusters lurking within.***



***The globular clusters in NGC 7049 are seen as the sprinkling of small faint points of light in the galaxy's halo. The halo — the ghostly region of diffuse light surrounding the galaxy — is composed of myriads of individual stars and provides a luminous background to the remarkable swirling ring of dust lanes surrounding NGC 7049's core.***

***Globular clusters are very dense and compact groupings of a few hundreds of thousands of stars bound together by gravity. They contain some of the first stars to be produced in a galaxy. NGC 7049 has far fewer such clusters than other similar giant galaxies in very big, rich groups. This indicates to astronomers how the surrounding environment influenced the formation of galaxy halos in the early Universe. The image was taken by the Advanced Camera for Surveys on Hubble, which is optimised to hunt for galaxies and galaxy clusters in the remote and ancient Universe, at a time when our cosmos was very young.***

☞ (cont. from p.1)

in astronomy and his significance as a true scientist of the Renaissance. A memorial to his remarkable life now stands in the grounds of Syon House, close to the presumed location of his residence. Thomas Harriot is the unsung hero of UK science. The hope is that his status as a pivotal figure in the history of astronomy is enhanced as a result of publicity generated by Telescope400 and IYA2009.



**Lord Egremont of Petworth unveils the Harriot Memorial Plaque (Photo by Tony Marshall).**

Telescope400 is a National Astronomy Week project for IYA2009. It was funded by a grant from the RAS.

The website at:

[www.telescope400.org.uk](http://www.telescope400.org.uk)

carries a fuller account of the Harriot Quatercentenary event at Syon Park with pictures and information about the project.

**Teresa Grafton**



**Solar Telescopes at work (Photo by Brendan Blake)**

There were many displays of telescopes, where one could examine some superb amateur instruments and even view the Sun through special solar filters.



**Allan Chapman enthralled an audience of 200 in the Garden Room (Photo by Brendan Blake).**



**Robert Massey ( of the RAS) creates a comet (Photo by Brendan Blake). He was at times almost obscured by clouds of gas from the dry ice to the delight of audiences.**

## Richard Knox retires as editor

After eleven years of sterling service to Gnomon, Richard is handing over the reins to Anne Urquhart-Potts. During this time, Richard has moulded and developed Gnomon until it has become synonymous with his name! Hopefully he will continue to contribute so that we can still enjoy his wit. Thank you Richard, from all the AAE, for all you have done.

**Anne**

## And "OOPS"

The last issue of Gnomon had Vol. 29 No 4 on the header but those of you who were not on holiday at the time will have spotted that it should have been Vol. 28 No 4. This issue begins Volume 29! Sorry.

### Subscription Rates:

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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:

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### Publication Dates:

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



## Total Eclipse in China

In August I was lucky enough to be invited to accompany John Baruch of Bradford University on a trip to China to see the total eclipse of the Sun. We flew out via Hong Kong and travelled by express train to Guangzhou. There we met up with a party of secondary school children from Guangdong Experimental High School. Our party of 100 advanced by sleeper train to Chongqing where we did tourism in 30 degree heat! We then embarked on a Yangzi River cruise boat for a 3-day cruise through the famous Three Gorges. A highlight was doing astronomy using a Meade ETX105 from the observation deck – the boat was moored at the time! All the children were very interested and they all spoke very good English. At the end of the cruise we disembarked in Yichang, a large city to the west of Wuhan and exactly on the centre line of the eclipse.

The night before, the adults did a reconnaissance to find a good observing site. Several parks on the banks of the Yangzi were offered but they all had street lights that might have come on in the dark of totality. Finally we found a new side road which was presently a dead-end, so we chose that.

On eclipse day we got up at 5:00, had a quick breakfast and headed out for the site. We started setting up before 6:30 with the prospect of first contact at 8:12. I had the EXT105 with screw-on filter which I dedicated to visual observations. Many of the children took photographs at the eyepiece. I also had an inexpensive 1000 mm lens for my Pentax SLR camera.

The school's four Celestron refractors were set up for projection. As first contact approached the light cloud obligingly cleared away leaving a clear blue sky. We were all delighted to see first contact so clearly. A few local residents came for a look as did two perplexed policemen. They were all interested in the images.

As totality approached some groups got ready to look for the planets and bright stars using NASA charts. Others photographed the vanishing Sun. A great cheer went up at totality. I worked on photographing the corona – see photo. The six minutes flew by and my last photo before the end of totality might show small red prominences. The majority of the party started to think about packing up but the die-hard astronomers stuck it out to last contact, making the coach driver increasingly impatient!

Another experiment run by two of the pupils proved successful. I took a combined indoor/outdoor thermometer. We covered the outdoor sensor with a piece of cloth dipped into a small



**Children from the High School get ready for totality. Note the clear sky.**

container of water. This made a wet and dry bulb hygrometer. The two girls took readings every 5 minutes. The results show the clouds clearing and then the temperature falling to totality. The wet and dry bulb temperatures come closer together showing the humidity increasing. A very pleasing result from a simple experiment.

Everyone agreed that seeing a total solar eclipse is the event of a lifetime – never to be forgotten.

My thanks go to Dr John Baruch of Bradford University, Dr Qian Huang of South China University of Technology, Guangzhou, and the staff and pupils of the school.

**Alan C Pickwick**



**The corona showing the characteristics of the quiet Sun. A few traces of the Sun's magnetic field are visible. Photo: Alan Pickwick**

## THINGS AREN'T WHAT THEY SEEM

When it comes to talking about astronomy there are two problems that are worldwide. The first, is that the commonly held ideas that people have about the Earth, its daily and seasonal changes and its place in the solar system, are based on their Earth-bound view and expressed in everyday language, e.g. the Sun goes across the sky. Whereas astronomers see these things from an astronaut's view, e.g. it is the Earth that is turning. These two views of the same things and events are the cause of confusion, particularly with children.

The second is that, by convention, north is accepted as the "top". The earth is basically spherical. A sphere doesn't have a "top" so it is just as correct to put the South Pole at the "top". From this, much of our understanding about our position on the Earth and its associated vocabulary has arisen. Much astronomical vocabulary and many illustrations are northern hemisphere oriented which can make understanding them difficult for people in the Southern Hemisphere. We commonly talk about "down under", going "up north", "middle east". From a Southern Hemisphere, (e.g. New Zealand perspective) being on 'top', means that the Northern Hemisphere is "down under", we go "up south", our "middle east" is the United States and our "far east" is the UK. What the Northern Hemisphere calls the "far east" is our "near west". It is all a matter of perspective!

Students ask "Why does a clock go clockwise?" Answer: "Because in the Northern Hemisphere the Sun goes clockwise across the sky (from left to right). If clocks had been developed in the southern hemisphere clockwise would have been from right to left. Something to think about?"

**Eric Jackson**

# Letter from Japan

As many of you may know from visiting my home page, one of the things I have in common with our long-serving Gnomon editor Richard Knox is a chronic case of umbraphilia. No, it's not some nasty strain of flu; rather it is an insatiable desire to spend as much time as possible standing in the shadow of the Moon. There is no known cure, and only a regular "fix" of getting oneself in the path of totality during a solar eclipse stops us going completely mad. I first caught the eclipse bug back in July 1991, when I had the opportunity to join a group of Americans and New Zealanders heading for the Baja peninsula of Mexico to experience nearly 6 ½ minutes of totality. We were blessed with excellent weather, and although I thought I had a pretty good idea of what to expect when the Moon completely covers the Sun's disk, I was completely blown away by the sheer beauty of the wispy, pearl-white corona, the delicate crimson prominences, the strange twilight glow all around the horizon, the all-too-sudden "Diamond Ring" effect as the first piece of Sun re-appeared from behind the Moon, and then seeing the Moon's shadow race away across the adjacent mountain ranges. This one was about as long as a total eclipse can possibly be and yet I wanted more!

The years since have seen me camping in the Atacama desert of Chile and the outback of Australia, travelling across Europe, Russia, Mongolia, and China by train, cruising on the Caribbean and twice venturing across Turkey in search of my next "fix". Only once have I been denied. That was in Mongolia in March 1997 when both Richard and I found ourselves standing in the snow by the side of a road under heavy cloud as the Moon's shadow duly swept over us. For sure it got very dark and although we missed seeing the corona on that occasion, I will never forget the friendship we forged on that journey, nor the incredible views of Comet Hale-Bopp under the darkest night-time sky I have ever witnessed.

Eclipse circumstances recur every 18 years, 11 1/3 days in what is known as a Saros cycle. The next eclipse in the same Saros as the Baja event would occur on 22 July 2009, but because of the extra 1/3 day the eclipse happens about 120° further west, putting it in Asia. This eclipse would bisect India, then sweep across Nepal, Bangladesh, Bhutan, Tibet, Myanmar, and across central China before heading out into the Pacific, where the maximum eclipse duration of 6min 39s would occur in the Sea of Japan. The longest land-based totality would be a few seconds short of 6 minutes from south of Shanghai, which itself would enjoy 5 minutes of totality. The weather prospects in what is after all monsoon season in Asia were only 50:50, but were generally worse inland. So Dave Moser from Tucson, who led the 1991 Baja expedition, engaged the services of the ChinaPlus tour company to take 41 of us on a 17 day tour of China, beginning with an eclipse viewing from the town of Jinshanwei, about 50 km south of Shanghai on the eclipse centreline.

Most of the group arrived from the USA in Shanghai two days beforehand, where my wife and I joined them from Australia. After a brief tour of the highlights of Shanghai (which is frantically being prepared for World Expo 2010), we went to Jinshanwei the night before the eclipse. At my pre-eclipse briefing in the hotel that night, Mother Nature was throwing everything at us in the form of thunder and lightning. July 22 dawned humid and overcast, but being so close to the ocean and with the nearest mountains several hours drive away, we had few options for trying to run to a location with better weather. In the hour before totality

at 9:40 am, we had occasional thinning of the cloud which afforded us the rare opportunity to glance up briefly and catch a glimpse of a crescent Sun without needing the usual filters. But as totality approached and the air temperature dropped the cloud got thicker, and it even started to rain lightly. Not being able to see exactly when totality began, it just seemed to keep getting darker and darker for what seemed like an eternity. Undeterred, the workers on a building site adjacent to our hotel kept right on working, even welding! At last it got noticeably lighter again, and the locals put on a fireworks show for us to try and mitigate the disappointment at missing the longest total solar eclipse this century.

From there our tour took us to the delightful gardens and canals of Suzhou, then we flew to Yichang to begin a 4 day cruise up the Yangtze River passing through the Three Gorges Dam locks and the magnificent Three Gorges themselves. After disembarking in Chongqing (the world's fastest growing city) and meeting the giant pandas in the zoo, we flew to Guilin for a cruise on the Li River, surrounded by towering karst limestone formations. Next stop was Xian with its impressive City Wall, and of course the site where the Terracotta Warriors were discovered and are still being unearthed today. Our final stop was Beijing, with the obligatory visits to the Summer Palace, Tiananmen Square, Forbidden City, Temple of Heaven, and the Great Wall. For me, the highlight though was being able to revisit the Beijing Ancient Observatory. When I last visited Beijing in 1997 after the Mongolia experience, this museum was in danger of being demolished to make way for new roads and tower blocks. So I was relieved to see it still survives, albeit surrounded on all 4 sides by expressways!



***The Beijing Ancient Observatory is built upon part of the original city wall, and houses several quadrants and armillary spheres provided by Jesuit astronomers, as well as celebrating important contributions by several Chinese astronomers.***

Fortunately by now most people on our tour had forgotten why they came to China in the first place, in the height of summer no less, and everyone agreed it had all been well worth it to experience the very ancient and very modern China firsthand. Fortunately another eclipse is always just around the corner and, although I may have to pass on Easter Island in July 2010, far north Queensland for the eclipse in November 2012 is not that far away.

## The Night Sky Simulator

One aspect of modern observational astronomy which all planetarians should be including in their programmes is the enormous variation, on cloud-free nights, in the visibility of the night sky depending on the observer's location. How much will the local light pollution allow their audiences to see? How can they give information on the likely visibility of the stars to a group of people who have come from many different locations?

Certain television programmes, including weather 'slots' which now often include astronomical information, sometimes seem to assume that meteors and other phenomena will always be visible. Planetarium educators will be aware of the fact that some of their visitors may enjoy near-pristine night skies, while others will live beneath an almost impenetrable orange glow. It is highly likely that audiences will have heard of light pollution, since the BAA's Campaign for Dark Skies, the CPRE and other bodies have done well in publicizing this issue nationally. If I may introduce a personal note to illustrate this, I went for a hospital appointment recently, and the staff member dealing with my injured hand asked me what I did for a living and if the injury would affect this. When I mentioned my planetarium, she assumed I meant an observatory (a common misapprehension among people who have little interest in astronomy), but then added that it was a pity that "the light pollution means you can't see many stars". Similar encounters have convinced me that the general public, whether or not they are amateur astronomers, are certainly aware of the issue.

Showing the extent of light pollution that audiences may encounter is not as easy as it sounds. In the case of static planetaria, members of the audience may not necessarily live in the immediate area of the planetarium and so they may come from places with very different light-pollution levels. Mobile domes visiting schools, scout/guide groups

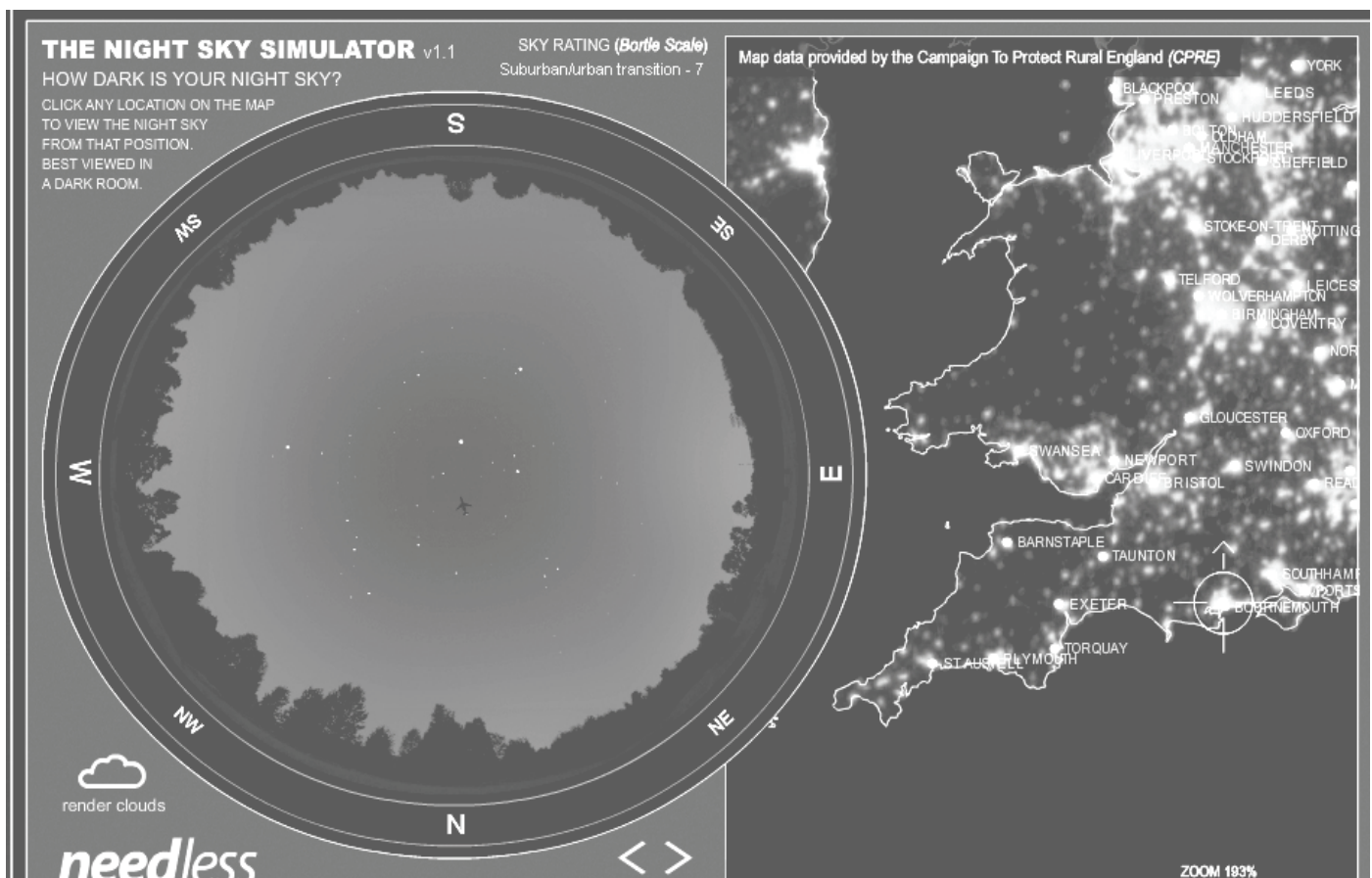
and the like may well have audiences whose members all live locally, but the planetarium operator himself/herself may not be familiar with the area.

One new web resource which will enable both teachers



**Dan Nixon (left) receives the Joy Griffiths Award from Bob Mizon, CfDS coordinator.**

and learners to assess sky visibility in any part of the UK is the Night Sky Simulator. Young Essex-based graphic designer Dan Nixon was last year's winner of the Campaign for Dark Skies' Joy Griffiths Award for promotion of the dark-skies message through his artwork and fascinating website [www.need-less.org.uk](http://www.need-less.org.uk). He has produced an interactive online dark-sky simulator. The Simulator collates data from night-time satellite images to create a realistic, all-sky



**The simulator showing the polluted view of the night sky as seen from Bournemouth. Ignore the Boeing 727 crossing the sky!**

view from anywhere in the UK, urban or rural. Moving a target arrow to the observer's location shows the night sky as it would appear to the unaided eye, with the zenith at centre, and the canopy of the stars and the Milky Way (if visible). This is similar to the all-sky vault experienced in a planetarium. Light pollution from nearby towns is realistically portrayed, and even the effect of clouds can be added. The compass direction towards which the observer is facing can be altered.

Have a look at the Night Sky Simulator on [www.need-less.org.uk](http://www.need-less.org.uk) (and follow the link).

**Bob Mizon**

## Curriculum Corner

*This is the second in a series of nine from Eric Jackson, entitled "Daytime Activities" It is really helpful to have things to do when the stars are unavailable (which is most of the time in Britain!) and so these activities could also be used on cloudy observing nights. Many thanks, Eric!*

### FINDING MAGNETIC NORTH

**Required:** A magnetic compass (orienteering compass) for each group. A sheet of paper and pencil for each student.

Give each small group a magnetic compass. Ask the groups to work out how to get the needle to point N and S.

1. What do these, and other letters on the compass refer to?
2. Work out the numbers for each of the letters?
3. What are the numbers called?

On the sheet of paper have each student draw about a 10cm circle for a compass outline and write in some of the degrees around the outside edge.

**Note:** A "magnetic" compass has a magnetized needle that is able to turn and so points to the magnetic poles of the earth. The main points of a compass are called the cardinal points. The numbers are the degrees going clockwise from 0 to 360. Students need to know the degrees for the four cardinal points.

Then get the students to do some research:

1. What are the true north and south poles?
2. Where are the magnetic south and north poles, and what is interesting about them?
3. What the magnetic variation is for your place.

Now introduce a globe and explore it to find out:

1. What a meridian is, how many are printed around the globe, and which one your time is taken from?
2. What a.m. and p.m. mean?
3. What is important about the Greenwich Meridian and the 180th Meridian (the International Date Line)?

**Vocabulary:** magnetic variation, compass, meridian, international, degrees, cardinal, Greenwich, orienteering.

**Eric Jackson**

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## The AAE AGM at Mill Hill

A small band of us met on sunny Saturday 26 Sept at the UCL's observatory at Mill Hill. Sotira's presidential report was full of IYA2009 events, the Universe awareness UK project and the Galileo Teacher Training Project. So far IYA has been a huge success with about 2 million people taking part in the "100 Hours of Astronomy" and with a database of two thousand teachers involved in "Globe at Night". The national newspapers have covered these events. Five or six of the Cornerstone projects will carry on next year in some form. Sotira also talked about the "Deadly Moons"

programme (i.e. "Cool" moons), which aims to raise the

awareness of children of their place in the Universe by providing slide shows in market places.

A new Council was voted in for 2009/10 (and the list appears below). There were votes of thanks to Sotira for her hard work on behalf of the AAE during her two years' presidency and to Alan Pickwick for preparing very thorough accounts (as usual!). Thanks also go to Nigel Burin, honorary auditor.

A welcome break for lunch followed, during which Mike Dworetsky set up a solarscope so that AGM participants could view the Sun's disk. A large prominence was visible and also some smaller prominences and two bright plages.

In the afternoon Chris Hudson presented hands-on activities for Cubs and Brownies which make it easy for their leaders to award the badges of Cubs Astronomer or Brownie Stargazer respectively. Most of this work is done with the whole pack, rather than individual children, and the programme takes about two hours.

Catalin Mosoia spoke about "Education, Science Communication and Working with the Media". He is a science journalist with Radio Europa FM and also edits and writes for "Science Newspaper", an on-line journal. He had many tips to offer on how to use the media more effectively. He focussed on planning press releases at the right impact level and also discussed how to cope with being interviewed live on radio or TV. We also learned what a "sound-bite" is.

The new Council would like to extend their warm thanks to Mike Dworetsky for hosting this meeting and for arranging the nice food and drink. We also thank the Observatory for allowing the AAE to use the facilities. It is always a pleasure to visit Mill Hill.

### COUNCIL 2009/10

Acting President	Mike Dworetsky
Vice Presidents	Robert Massey Francisco Diego Sotira Trifourki
Treasurer	Alan Pickwick
Secretary	Teresa Grafton
Assistant Secretary	James O'Neill (and Sotira will also act as an assistant)
Council Members	Sandra Voss Dave Buttery Simon Ould

The new Council also co-opted the following:

Resource Centre Rep	Chris Hudson
BAP Rep	Shaaron Leverment
Gnomon Editor	Anne Urquhart-Potts

### EXTRAORDINARY GENERAL MEETING

Six Council members present at the meeting wished to call an extraordinary meeting of all the membership to discuss future directions for the AAE. Please read the enclosed flyer for details of the date and venue. It is very important that a good cross-section of members attend this.

### OUR NEW PRESIDENT

We welcome Mike Dworetsky into the President's Chair. Mike has recently retired from the directorship of UCL's observatory at Mill Hill and he has been a stalwart member of the AAE for nineteen years. He was Vice President as long ago as 1993 and has held posts on Council with almost no breaks since then! We wish him a good year.

**Anne Urquhart-Potts**

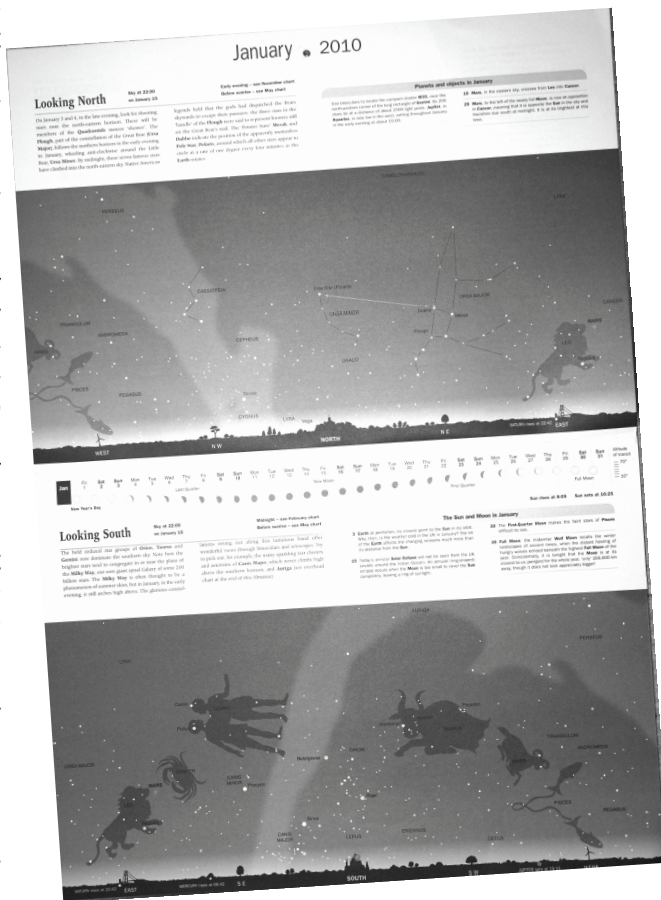
## For your Library

*Stargazers' Almanac 2010. Monthly guide to the Stars and Planets. Various contributors. Floris Book. ISBN 978-086315-723-3. £14.99*

The publication of this now well established almanac has now been taken up by Floris Books, but the format remains the same as for previous years.

Each mid-month night sky is illustrated with two maps, one looking north and the other south. Each sky map and its accompanying text occupies an A3 page to give an overall area of about A2 size for each month when the almanac is hung up. The elegant artwork makes the publication suitable for gracing any wall, and its size would suit a school library or science room perfectly, allowing everyone to get a good view.

The charts show the sky as is seen from mid British latitudes (just as the monthly data for rising



and setting is prepared in *Gnomon*) with rising and setting times for planets or the Moon. If any planet or the Moon is not in the sky at the time for which the charts are drawn, 22:00 hours, but are visible during the hours of darkness at some time, the times, and the positions of rising or setting on the horizon are also shown, as can be seen in the sample month illustrated.

The commentary for each month also outlines the visibility of the planets and the Moon, with notes about the Sun and Moon phenomena (eclipses, transits etc.) and special events for the planets. In addition, there is a calendar for the month, showing the phases and altitude of transit of the Moon for each day. The notes draw attention to some point of interest in the stars prominent for the month, with tips on observation and a sprinkling of folklore.

Regular features in the almanac are the notes on astronomical observation, some definitions, references and selected websites, together with charts of the north celestial polar area, and the zodiac.

There is a regular feature on the Campaign for Dark Skies, and a "Curriculum Corner"-style project on the construction and use of an astrolabe, complete with plans for those who don't want to work too hard! This project would be particularly suitable for a practical project for science and mathematics, and the result is a very useful accessory for astronomical work.

The *Stargazers' Almanac* is, not least, a useful addition to your Christmas wants or gifts lists!

**Richard Knox**

*The Galaxy Disk in Cosmological Context (Proceedings of the International Astronomical Union Symposium 254) Edited by Johannes Andersen, Joss Bland-Hawthorn and Birgitta Nordstrom. ISBN 9780521889858 (hardback) 508pp Mainly black and white, with a few illustrations in colour. Price £68.00 (US\$135.00)*

This professional symposium was held at the Niels Bohr Institute, University of Copenhagen, in June 2008. Its purpose was to discuss the discrepancies between models of the formation and evolution of disk galaxies and the observations of these galaxies that we can make today. There were 235 participants from 35 countries, 80 of them women. The time and venue were chosen to celebrate the 100<sup>th</sup> anniversary of the birth of Danish astrophysicist Bengt Stromgren, who pioneered studies of the disk of the Milky Way.

This is a weighty tome comprising papers presented at this conference, all at a professional level, properly referenced, and therefore not very suitable for the classroom teacher or school student. The reader is not spared the maths and the level is at least 3<sup>rd</sup> year undergraduate or higher. The 120 poster papers which were also presented could not be accommodated in this book but will be available with the on-line version of the proceedings of the conference.

This is a very comprehensive review of the research area which will find its place in every reference library of all research establishments having any involvement in disk galaxies.

**Anne Urquhart-Potts**

## IYA2009 Still Not Over!

There are still events coming up this autumn if you want to join in.

**Autumnwatch:** After the success of 100 Hours of Astronomy, there is another event planned for 22-24 October, called "Galilean Nights". The focus will be "sidewalk" observations of Jupiter and its moons. More info at

[www.galileannights.org](http://www.galileannights.org)

**Worldspaceweek:** The UN has declared the week 4-10 October to be a world wide space week. For more information contact Sotira Trifourki at [sotira#stemsalford.org](mailto:sotira#stemsalford.org)

**Kielder Forest Star Camp:** held in Northumberland 14-19 October under the dark skies of the north. This event is now full—book early for next year!

**SPA's Autumn Moonwatch** 24 October-1 November and the **Schools Moonwatch** 19-29 November. The Moon is high in the sky and it gets dark early. More from

[www.popastro.com](http://www.popastro.com)

The Norman Lockyer Observatory's "Touch the Planets and Stars" event for the visually impaired, on 12 October at Sidmouth. Explore a set of Moon models and enjoy a planetarium programme.

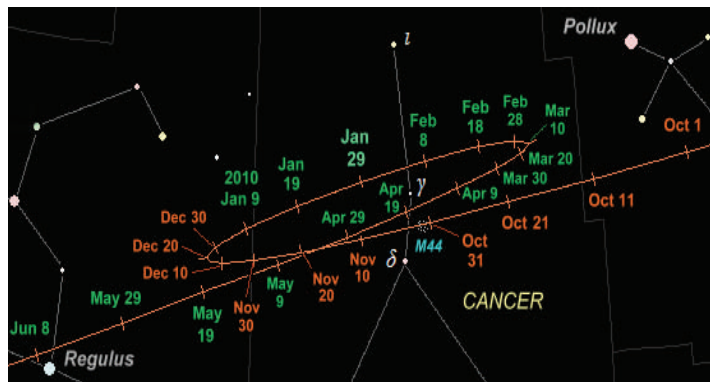
# Sky Diary Spring 2009

The first thing to remember is that the clocks “fall” back during autumn to GMT. This happens on October 25 and means that those wonderful early dark nights will be with us soon. It is an exciting time to be an astronomer. We have the exciting International Year of Astronomy still to finish and there is plenty of planetary action to come. So wrap up warm and head outside with this guide to the end of 2009.

Mercury is an early morning object during the first fortnight of October, low in the SE just before sunrise. It is at its greatest elongation west of the Sun on October 6, an unusually good chance to see this elusive little planet. After disappearing during November, Mercury reappears in December as an evening object, very low down in the SW after sunset. On the October 18 it is in conjunction with a new Moon.

During this quarter Venus can only be seen during October. It is another morning object close to Mercury and Saturn shining brilliantly in the pre-dawn sky at a magnitude of -3.9. Relative to the stars, Venus will be moving rapidly south-eastwards from Leo into Virgo. However, Venus is so intensely bright that it is much brighter than the surrounding objects and can be seen even in a brightening sky, and even at low altitude. On the morning of Friday October 16, the waning Moon will be a hand’s-breadth to the right of Venus.

Mars quickly travels out of Gemini, through Cancer and then in and out of Leo during the rest of this year, slowing it seems and then turning to travel westward (see picture). It does this due to its retrograde motion. It’s a wonderful display of celestial geometry. The combined orbital motions of



The position of Mars during 2009/2010

Earth and Mars create the appearance of a celestial loop-the-loop. Mars seems to be moving backward because the Earth is actually approaching and overtaking it. Since the distance between Earth and Mars is smallest at this time, the Red Planet shines brightest and presents its largest angular size to telescopic observers. On October 14 it will be exactly in line with the “Twin” stars of Gemini, Castor and Pollux. Towards the end of November Mars lies in front of the Beehive cluster, a beautiful sight and also a good photo opportunity.

Moon phases for the last quarter of 2009				
	New Moon	First Quarter	Full Moon	Last Quarter
October	18	26	4	11
November	16	24	2	9
December	16	24	2 & 31	9

Rising and setting times (UT): lat.52°N; long.3°W						
	October 15		November 15		December 15	
	Rise	Set	Rise	Set	Rise	Set
Sun	06:36 ♋	17:17	07:31 ♌	16:20	08:13 ♍	16:00
Mercury	05:10 ♋	17:04	08:11 ♌	16:27	09:54 ♍	17:14
Venus	04:29 ♋	16:49	06:09 ♌	15:55	07:42 ♍	15:34
Mars	22:37 ♊	14:46	21:48 ♋	13:24	20:23 ♌	11:48
Jupiter	15:20 ♋	00:30	13:22 ♌	22:36	11:32 ♍	21:03
Saturn	04:17 ♋	16:48	02:33 ♌	14:52	00:48 ♍	12:58
Uranus	16:25 ♋	04:01	14:22 ♌	01:55	12:24 ♍	23:53
Neptune	15:30 ♋	01:11	13:28 ♌	23:05	11:31 ♍	16:00
Moon	03:03 ♌	15:50	06:12 ♍	15:06	07:37 ♎	14:50

Data for other venues and dates can be estimated from this (and Moon phase) table. Symbols after rise times show constellations where body is, at rising. ♎ is a symbol “borrowed” for Ophiuchus, the “13th” zodiacal constellation.

In the middle of an October evening Jupiter is due south, although quite low. It sets in the south-west around midnight. Relative to the stars, Jupiter is bright and almost stationary in the constellation of Capricornus. Throughout November this largest planet in our Solar System is visible all night, rising as the Sun sets and appearing at a respectable magnitude of -2.4. Binoculars will reveal the four Galilean moons stretched out in a line. Telescopes will show belts and zones on the planetary disc and even the Great Red Spot. Still visible during December, Jupiter will be very low in the west.

Saturn is a morning object and will take some time to rise out of the morning sunlight during October. On the 13th it is in conjunction and side by side with the much brighter Venus. As the rest of the year passes it will be harder to see any ring detail since the rings are virtually edge-on but this allows a good opportunity to observe the fainter moons. This is a good time of year to try and spot sporadic meteors, those which may appear at any time, in any part of the sky. These “shooting-stars” are tiny specks of interplanetary debris as they burn up in the Earth’s atmosphere. At certain times of the year, the Earth travels through a cloud of this dust, and we get a meteor-shower. During October we have the Taurid meteor shower beginning on the 20th and carrying on until late November. Expect to see a maximum of only 10 an hour. On October 23 the Orionids peak and clear skies should give a rate of up to 25 per hour after midnight. November sees the Leonids that peak on the morning of Nov 18. This normally yields around 10 meteors per hour, but has shown extra promise over recent years with sightings of bright fireballs. December holds the best shower for 2009. The Geminid shower occurs between the 9th and 14th, peaking on the 13th. On dark, clear nights, you can see up to 75 per hour. There will be moonlight to interfere this month, so don’t expect a good display.

In mid October, there is an interesting dawn line up in the morning sky: the Sun rises 10° south of east with an extended line of planets along the ecliptic starting with Mercury lowest (at 13° elongation), Venus (20° elongation), Saturn (22°), next the thin crescent of the waning Moon (elongation 34° - the New Moon is October 18th) and, highest in the sky, Mars (61° from the Sun). Here is another chance of a good photograph.

James O’Neill  
Richard Knox