GNOMON

Newsletter of the Association for Astronomy Education

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Edinburgh observatory offers teaching aids

Sets of laboratory exercises for use as experimental material for school and university students have been developed at the Royal Observatory, Edinburgh. These are designed around the use of film copies of original photographs taken with the UK Schmidt Telescope (in Australia) and are identical to those used by professional astronomers. The equipment required is a lightbox and hand magnifier.

The films have been chosen so that, if possible, each can be used for more than one exercise. Each film is a 14 X 14in (356 X 356mm) negative transparency (star and galaxy images appear black against a pale grey sky) and cover 6.5 X 6.5° of sky. These films are also useful as "visual aids" showing particularly interesting regions of the sky. The packages may therefore prove attractive to other groups such as astronomical societies. Areas in the packages include the Virgo cluster of galaxies, Orion, the Vela supernova remnant, the Magellanic Clouds, and Comet Halley.

Three separate specialised packages are available; each is accompanied by a booklet describing exercises which can be carried out using the material. These packages are "Edinburgh University Teaching Package for Undergraduates", "Edinburgh Spectroscopic Teaching Package" and "Edinburgh Cosmology Teaching Package".

Further details of the packages (and other film material available) can be obtained on the website:

//www.roe.ac.uk/ifa/wfau/ukstu/

The Observatory also has supplies of full-colour posters (size approximately 22 X 29in) all made from original photographs taken with the UK Schmidt Telescope. The posters will be supplied with an information sheet describing the objects on each poster. The posters available are: Nebulosity in Sagittarius; Lagoon nebula (M8); and the Eta Carinae nebula. The three posters can be ordered as a set by post from the address below for £6.00, inclusive of VAT, postage and packing.

Two further posters are available at a cost of £2.50 each: The Rho Ophiuchi complex; and the Vela supernova remnant. The set of all five posters is available by post for a total of £14.50. (within the UK). Cheques should be made payable to "Royal Observatory Edinburgh".

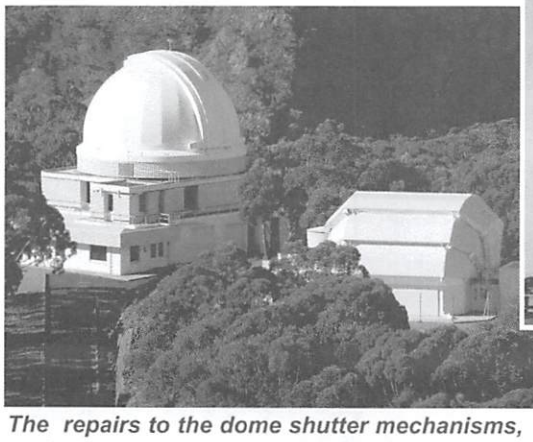
To order these posters or to receive further information on the teaching packages and films please e-mail:

ukstu@roe.ac.uk

or write to UKST Plate Library Royal Observatory Blackford Hill Edinburgh EH9 3HJ. ☎0131 668 8330 or 8100

Sue Tritton (sbt@roe.ac.uk)

The AAO and Faulkes South in race to open



The repairs to the dome shutter mechanisms, and commissioning the dome control systems of the Anglo Australian Telescope, are nearing completion in Australia (see Gnomon *Vol.23 No.4), while the new Faulkes South telescope nears the end of the installation phase, ready for first light alongside its older cousin (see also next page).*

(Photos: Stuart Ryder, AAO)

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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,

Cornwall Bright Skies Project

The AAE has been asked to support the Camborne School and Community College in its bid for funds to build a heliostat on the roof of the 'Classroom of the Future'. This is a new eco-friendly learning resource at the school (see *Gnomon* Vol. 22 No.4) which is the first Specialist Science School in the county,.

To obtain European funding, which the project requires, it needs support in writing, which Alan Pickwick has undertaken to carry out on behalf of the AAE.

The project will involve the construction of a heliostat at the new Camborne Pool Redruth Learning Space at Camborne School. Camborne is an area suffering from economic depression, and it is hoped to both raise aspirations towards following scientific careers, and creating an active interest throughout the community in astronomy and network the facilities throughout the county.

The telescope will project an image of the Sun about 1m diameter onto a table in the classroom and onto the internet, and will be used for science experiments for students of all ages, up to HE level. This will tie in with the successful work being carried out at the Callington Space Centre, and bring their courses further west into the county.

Web links include:

www.cprlearningspace.co.uk and

www.callingtonspacecentre.co.uk

Buy Jupiter - and all the others!

Good home wanted for nine planets, and a Moon. Would suit any budding star system constructor looking for ready-made models. Magratheans (especially Slartibartfast) need not apply.

They are actually only models, but they are in full colour and in good condition. They are made as hemispheres, designed to be mounted against a wall.

Each of the planets is made to the same scale as the others. The largest (an uninhabited gas giant called Jupiter) is described as having a semi-circumference of over 3m. Two utterly insignificant little planets, one blue-green with ape-descended life forms, and a hellishly hostile but beautifully white cloud-shrouded twin, have semi-circumferences of 1.25m. The height of the largest of this collection is some 2m.

The planets' prospective new owner will have to collect them from a city on the full-scale version of the aforementioned blue-green planet, called Reading (the place, not the planet!). More details are available on request from Teresa Grafton:

(**Teresa.Grafton@madame-tussauds.com**)

Faulkes Telescope North gets results

Significant progress was made with FT North as the first truly remote automatic operations were achieved with the telescope during June.

The telescope automatic control system assessed the weather conditions, started up the telescope and opened the enclosure and completed the observations in the queue. The telescope has also run a series of off-line observations. The telescope is now in regular real-time and off-line use from the UK. The project has been opened up to all registered users and some amazing observations have been taken.

At FT South in Siding Springs, Australia, (see photograph on front page) the telescope, enclosure and electrical equipment are all in place. The operating software is being installed and first light is expected soon. The telescope will then undergo a month of work constituting the first phase of commissioning.

Dill Faulkes, the founder of the project, received a letter from Prime Minister Tony Blair in July, voicing support for the project. "Getting young people excited by science is of vital importance to the future of our country" Blair wrote. For the full text of the letter visit the news section of the website.

Durham University is host to the Faulkes Classroom, where local students are able to use the telescopes and learn about astronomy from professional astronomers at the university. The classroom has received a donation of computing hardware worth about £30,000 by Sun Microsystems.

On June 24 the Project took part in an educational event at the Royal Institution, led by Dr Andy Newsam from the National Schools' Observatory. Over 350 students gathered at the RI to reveal their results of a study of quasars that has been ongoing since February. The audience was also treated to a live observation from FT North.

The website has received a make-over and has some new information which has been added about the project and the telescopes. The educational site has also been updated and has many new features. Have a look at the new image gallery on the web site

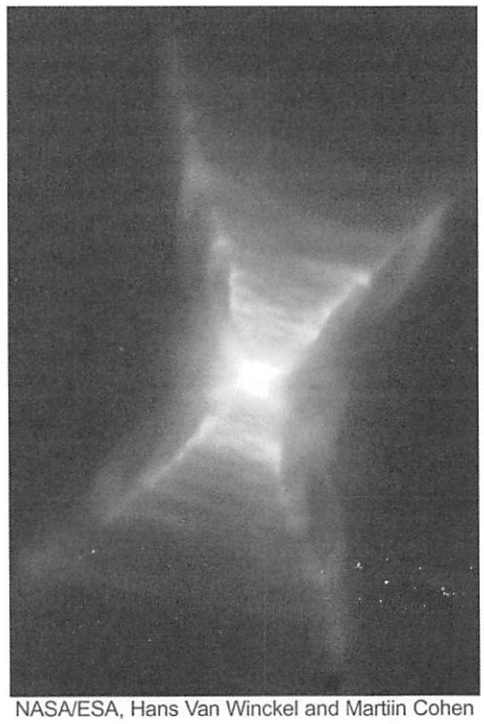
//faulkes1.astro.cf.ac.uk

Those who would like to be registered to the project should visit this website (as above but add:

/control/Register.isa)

Heavenly stairway?

Not a stairway to heaven, but the remarkable "red rectangle" (HD 44179) investigated by the HST in May, showing intriguing "ladder-like" structures round a dying star. Hans Van Winckel, Catholic University of Leuven, describes it as "projections of gas cones, like a series of nested wine glasses filled to their brims with gas and seen from one side" "Rungs" are possibly a series of rings of ejected matter, seen on edge.



NASA/ESA, Hans Van Winckel and Martiin Cohen

FOR YOUR LIBRARY

Stargazers' Almanac 2005. Technical Adviser Bob Mizon. Hawthorn Press. 32pp Full colour. Isbn: 1 903458 49 8. Paperback A3 size with loop and brass eyelet. Price £12.00
This is published in good time for your Christmas present list - and can be thoroughly recommended for that purpose, or indeed to put on your own wall next year!

Hawthorn has completely revised the new edition from the concept it first made available in 2002 (see *Gnomon* Vol. 21 No.2). The bulk of the almanac is a month-by-month double A3 page spread, that hangs on your wall as an A2-sized display, showing the views of the evening night sky at the middle of the month two hours after sunset as seen looking north and south. Stars are shown schematically in seven different shapes and sizes to represent stars down to magnitude 5 (although these faintest stars are included only when they add something distinctive to the shape of a group). The Zodiacal constellations are represented by ghostly graphic figures, clearly indicating the position of the Zodiac in the evening sky of each month. A sample has been hijacked for the "Sky Diary" in this issue (see page 8), slightly modified to line up with the planetary positions of the sky in December this year. This sample gives some idea of the appearance of a typical chart (although the colour had to be removed in *Gnomon*).

The illustrations are not intended to be star maps: their purpose is to help identify and locate each grouping (which include famous asterisms such as the Great Square of Pegasus and the "Teapot" in Sagittarius, as well as constellations). The larger format, leading to benefits such as the increased size of the sky charts, plus changes such as not filling the sky with spurious lines between the stars, all help to enhance the presentation.

The polar region of the sky is given in a separate chart in a circular format, with a selection of dates and times through the year round the circumference to show which part is nearest to overhead. Inexplicably, a large circle is cut out of the centre of the polar chart, so that Ursa Minor and a large chunk of Draco are missing from it, and the stars making each of the near-polar constellations are joined with lines. In the monthly charts the stars are, thank goodness, not joined up.

Naked eye planets and the Moon are shown on the main monthly charts where visible at the time shown. While the Moon is illustrated with its phase diagrammatically, the planets all have an identical blue circle symbol.

Each month has its calendar, which shows the Moon's phase each day, and the astronomical highlights of the month are reviewed. In addition, a constellation prominent in the chart for that month, and an object of interest is also selected for special treatment. The notes are completed with a note about the Moon and a general note about the planets.

The Almanac is completed with a full introduction, plus pages devoted to the constellations, the progress with combating light pollution (alas all too little!), and a page on the signs of the Zodiac. This is a nod towards New Age users and contains an important misconception: naked eye planets, and the Moon, can be located in Cetus, Orion, and Sextans, as well as the 12 "astrological" constellations plus Ophiuchus through which the ecliptic passes, so it is not clear how "the Zodiac passes through 14 different constellations" as stated.

There are a number of minor mistakes throughout the Almanac, some rather misleading for the absolute beginner. Also the phraseology can be a bit careless. For example, in describing the Moon's changing phases and position, the introduction states that one can "see how the Moon's path through the sky is *the reverse* of the Sun's" (my italics). This suggests the Moon is moving in the opposite direction to the Sun! It goes on to state, wrongly, that the Moon crosses low in the sky in summer and higher in winter. What is meant, as the experienced reader will know, is that the Moon moves in more or less the same apparent path across the starry background and in the same direction as the Sun, (although over 12 times faster). But since the Full Moon must be opposite the Sun in the sky, it is low in the summer sky and vice versa in winter.

One of the difficulties in producing this almanac must have been the description of time and position, bearing in mind a possible market stretching across a wide range of latitudes and longitudes. For the most part the results are satisfactory, but it would have been much better, and widened the market for the publication, to rid the text of daylight saving time by using UT, (or GMT, EST, or just local mean time.) throughout the year. It should also avoid statements such as "the southern half of the Scorpion is very low for UK observers" - which may be true if totally out of sight below the horizon at all times can be called "very low"!

Despite these errors and minor beefs, the Almanac is a most attractive and useful accessory to guide you through the year, and can be safely added to your Christmas present list (giving or receiving!). **Richard Knox**

Discover the Moon. Jean Lacroux and Christian Legrand. Cambridge University Press. 143pp. Full colour and mono illustrations. ISBN 0 521 53555 7 paperback. £10.99.
The Moon has become a bit old hat (except for Peter Grego's splendid contributions to *Gnomon* of course), so it is wonderful to have a book to encourage the real amateur to get to grips with the Moon. This essentially practical guide tackles the question of which way round the image of the Moon will appear in various telescopes and then presents all lunar surface photographs in this form

The first chapters describe the Moon and its features, theories about its origins and its motion and apparent motion in space. The authors shy away from giving approximate methods of determining the Moon's position, merely observing that it takes "formulae with several hundred parameters" to calculate its position accurately.

The publishers list Christopher Sutcliffe as one of the authors, and presumably he translated from the original French edition, published in 2000. But I could not find any credit for him in the book itself. It was a pity that some of the illustrations remain with French annotation. Perhaps English speakers are somewhat lazy in learning other languages, so the young observer, for whom this book could be a boon, might be put off. The "mnemonic" for remembering the shape of the First and Last Quarter (by using the french language terms) becomes far too complex. It is easier, and better anyway, to learn why the First and Last Quarters look like they do! There is plenty of simple and good advice on obtaining telescopic and photographic equipment (including warnings about costs) how to use it, and realistically, what to expect from it. Finally, and most important, it recommends methodical ways of relating what is shown and described in the book with the Moon as you can see it in the telescope.

The bulk of the book then takes 14 daily observations of the Moon starting with the "youngest" (cont. on page 6) ☞

CURRICULUM CORNER

Ever since the long-awaited total eclipse of the Sun in Cornwall, in August 1999, was attended by many hoping to see their first eclipse, (which turned out to be such a cloudy day that ruined any worthwhile glimpses from the UK) there are many people who have become determined to see at least one before they die. Unfortunately, the cycle of solar eclipses, which promises at least two events each year, can be spoiled by more than just the weather!

The main problem is that the average apparent angular diameter of the Moon in our skies is just a tiny fraction less than that of the Sun. This means that just over half of all central conjunctions of the two bodies, when the centre of the Moon's disc occupies the same position in the sky as that of the centre of the Sun's disc, result in an annular eclipse, when the Moon's shadow has diminished to a point somewhere above the surface of the Earth. In this event, the Sun's brilliant photosphere can never be totally obscured to reveal the amazing sights of the corona, or the chromosphere and prominences surrounding the Moon's black outline. The other main problem is that the shadow of the Moon, even when it does touch the Earth, may not do so in a convenient place. There is an awful lot of ocean under the Moon's shadow on many occasions, and tons of polar ice on others!

I became hooked on solar eclipses at a lucky time, and I have stood under the Moon's shadow five times since, and including, the total eclipse of 1995. Five easily accessible total eclipses in ten years is just about average. The chances in the next 30 years or so are not so good.

In the next solar eclipse, totality will last for a maximum of only 42 seconds, if you are on the very narrow path of the Moon's shadow in the middle of the Pacific Ocean next year on April 8. By the time the Moon's shadow reaches any land (in the Ithsmus of Panama) it will be an annular eclipse lasting 5 seconds!. After that, almost a year later on 2006 March 29, will be the best bet since 2002 for most people, a 4 minute eclipse visible across northern Africa from Ghana, across the Sahara to Libya, then over Turkey, across Russia and the north Caspian Sea and ending in mid-Siberia.

The next is another two years on, in August 2008, and you will have to go to somewhere between northern Siberia, western Mongolia or just into western China to see a magnificently eclipsed Sun closely attended by Venus and Mercury.

Then back to China again in 2009 for one of the longest eclipses of the 21st Century, 6min 38s on July 22. In the following year, from Cairns in northern Australia, you may see an eclipsed Sun immediately after sunrise for 2 minutes in November 2012, and then, discounting mid-ocean and polar venues, you will have to wait till March 2016 in the East Indies. Then at last comes an easy one, coast to coast across the USA in 2017. There are about eight reasonably accessible sites and dates after that until 2040, making in all some 14 solar eclipse trips worth trying over the next 36 years. After that, things pick up a bit and there are nine events worth a try during the next 20 years.

One thing is certain; however much effort it costs, make sure you get to see at least one. You will not regret it!

Richard Knox

Look for planets in the daytime sky

The late J.Leslie White used to relate how he was emerging from the London Underground one day, climbing a long, straight flight of stairs in one of those exits that emerge in the middle of a pavement. All he could see in the distant daylight frame in front of him was the approximate rectangle of blue sky. And in the middle of that small patch of blue, when nothing could have been further from his mind, he saw the brilliant spark of white that was Venus.

As described in this issue's "Sky Diary" (see the back page) the most favourable morning apparitions of Venus are one of the best times for seeing for oneself how visible the planet can be in the bright sky of full daylight, that is, after sunrise.

On October 31 at 02:00hr, daylight saving time ends and the clock should jump backwards to 01:00hr. So this may complicate your timing in the following experiment. I suggest you set your clock or watch to UT (GMT) towards the end of the evening of October 30 ready for the following day!

On October 31 at 7:00h UT, for example, Venus' declination is almost 0° (actually +0° 21') and Jupiter's is almost exactly -2°. These are very close to the declinations of zeta and delta Orionis (Alnitak and Mintaka) respectively, the stars marking the eastern and western ends of Orion's Belt. The two planets are almost 5° apart (about twice the angular width of Orion's Belt), with Jupiter to the east (nearer the Sun) and, although a little further south, in a fairly good line from Venus to the Sun.

With a bit of luck with the weather, you could set up a simple device to help test whether both planets can be seen in broad daylight. All sorts of aids could be used, but nearly all will need a tripod to set up. For example, you could fix a small diameter tube (preferably plastic, not more than about 2cm diameter and about 10cm long) on a photographic tripod.

Set this up outside during the evening of October 30 and set your watch to GMT (you will need to do this tonight anyway! You may be up late, but this is somewhat offset by the end of Daylight Saving Time!). Wait for Orion to rise into the south east, and at precisely 00:42h (GMT!) line up the tube on ζ Ori. (Alnitak). (Sorry about this - but you wait till you see what is suggested in "Sky Diary" that you have to do in the early morning of New Year's Day!) Alnitak is the furthest south and east of the three Orion's Belt stars.

The tube is now pointing at a part of the sky which is almost exactly at Jupiter's declination, and at an hour angle of 6h 48min from the planet, which is to the east. So now you can go to bed. If you return to the tube 6h 48min later, at 7:30h (still UT!) with total disregard for the loss of an hour or two, let alone your extra hour in bed, the Sun should have risen, and Jupiter should be in your sights.

If you need a bit of practice, just before 7:30 look to the right of, and a little above, the end of your tube by about the width of three knuckles of your clenched fist at arm's length and you should see Venus without any trouble. This gives you an idea of the relative brightness you may expect, and, more important, gives your eyes a chance to focus on a detail at infinity, not very easy in a featureless sky!

If you really want to be sure, find Venus just before sunrise, when it should be relatively easy even for bleary sleep-deprived eyes, and follow it from time to time as the sky brightens and the Sun rises. You can try this over any morning this autumn with Venus so prominent in the sky.

Доброе утро fantastic Venus!

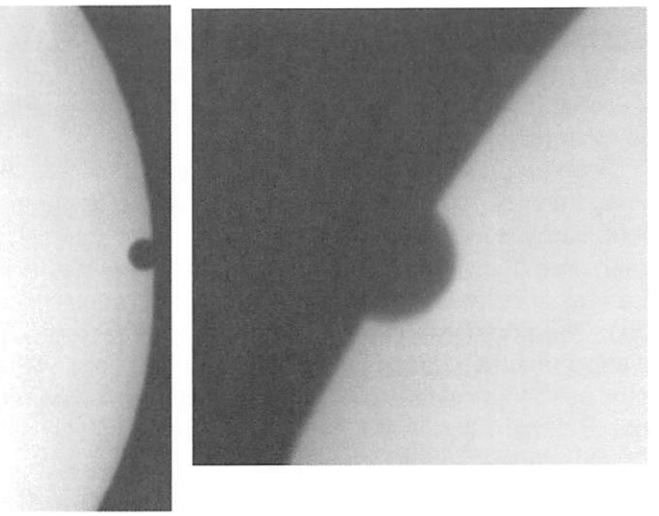
Venus crosses the Sun, 2004 June 8

Sirius-86, the astronomical educational organisation in Rezh, Russia, has exceeded its wonderful coverage of the transit of Mercury that we included in *Gnomon* (Vol. 22 No. 4) with some magnificent observations of the transit of Venus (2004 June 8). The group participated in an international project, Venus2004, organised by the European astronomical societies to cover the event.

Two methods of observation were used: chronometric (timing the contacts between the Sun's limb and the preceding and following sides of Venus' disc) and photographic.

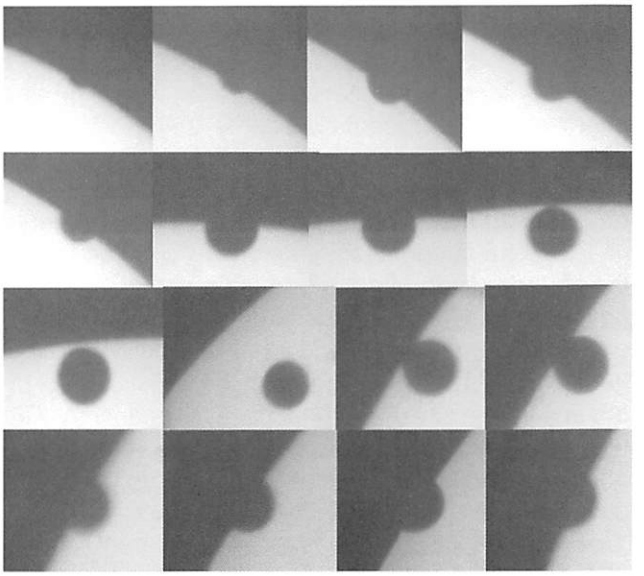
The area was blessed with almost perfect weather - merely a few small clouds - so that the whole of the programme of observation was achieved. Photography and registration of contacts were carried out with the help of a 110mm f7.3 Newtonian telescope with an AstroSolar solar filter provided by the Baader Planetarium, and an Olympus 740 digital camera on a telescope with a Rubinar 100mm, f5 lens. (Photos: Vladimir Golendukhin and Andrey Rybin.)

Vladimir Golendukhin



(Above left) A detailed view of Venus beginning its journey across the face of the Sun and (right) a detail during the egress.

It's all over! members of the Sirius-86 Association at the end of a memorable morning's observations of the transit of Venus from the Sverdlovsk area of Russia this June



Sequence of nine exposures (top to bottom and left to right) during the ingress of the planet, and seven exposures showing the egress

Sky Diary Autumn 2004

Highlights of the quarter include an eclipse of the Moon, the Geminid meteors, and an evening sky bereft of bright planets other than Saturn. In the morning skies, on the other hand, the planets are in abundance, and apart from Mars' faintness, all the naked eye planets will be visible just before sunrise on the days when Mercury is favourably placed towards the end of the year.

Much has been written and argued about the visibility of astronomical objects in broad daylight. One problem is to define "visibility". Is it only unaided eyes that are allowed, or can one use a dark tube, or binoculars, or a telescope?

In the planetarium, one of the points I find most interesting is when the Sun is rising and the stars fade from view. I then ask the children (which includes those with beards or with children of their own) "Where have the stars gone?". Responses have included: "to Australia" (actually, not bad!), "behind the clouds" (elements of truth there too): "gone to bed" (no marks for fact, but plenty for humour); "round the other side of the world" (not as good as "to Australia" I think), and so on. It is perhaps pedantic, but I feel it none the less important, to distinguish between the light of the Sun as in the Sun's brilliant (blinding!) disc, and the light of the Sun scattered through the Earth's atmosphere to turn the sky bright (eye-wateringly) blue.

What astronomical objects *can* be seen without any optical aid close to, or after sunrise? Have a look at the "Curriculum Corner" on page 4 in this issue, because this is a chance to describe an easy-to-try experiment for children of any age using the sky as it may be seen in December. Don't forget the usual warnings about looking at the Sun, by the way.

From mid-December until well into January, all five naked eye planets can be seen in the pre-dawn sky at the same time, even

☞ (continued on back page)

(from page 3)☞ (only 18 hours after New Moon?) that you can find, and going through the first half of a lunar month. The second half, it is noted, requires late night or rather early morning observation, which are deemed not observer friendly (Moon watchers are frequently surprised by the number of people who seem to be unaware that the Moon is plainly visible in the daytime sky - especially during the third quarter of the lunar month.)

Close-up photographs of lunar features are usually taken during the first half of the month, except where features are more easily seen near the sunset terminator. The photographs are designed to be of comparable detail to the view in a typical amateur telescope with average seeing conditions. The photographs are reproduced inverted, and both inverted and transposed left to right, to correspond with the usual astronomical telescope view plus that with a star diagonal. Southern observers can turn the book upside down! (Or use a non-inverting telescope?)

The text is concentrated to describe as many visible features as possible, with many additional side-bars on lunar science, the Moon's features, observing tips and some miscellaneous lunar lore and other facts and figures. Recommended for beginners. **RAK**

Urban Astronomy. Denis Berthier (translator Klaus Brasch). Cambridge University Press. 143pp. Full colour and mono illustrations. ISBN 0 521 53190 X paperback. £11.99.

This book looks at the stars through the typical urban atmosphere at night. It seems a shame that we have to admit defeat when it comes to light pollution. Not only is upwards-shining light spoiling our view of the stars, it is wasting energy, with all the resulting anti-social consequences.

The authors spend six pages (two chapters!) describing the life and death of stars and understanding the universe, before getting into the causes of light pollution (no mention of particulate pollution) and what can be done, and is not being done. Then they get into the practicalities of urban observing, the sky conditions, the instruments available and how to use them. This is a useful section of the book for all observers, even those lucky enough to be in the depths of the countryside with only moderate light pollution.

The book covers the use of equipment and what to observe starting with the Moon and Sun (for the Moon, go back to the book reviewed immediately above), planets and comets, many of which are relatively easily seen from urban observing sites. It then goes through the description of the starry sky season by season, using a planisphere type map, plus an artist's impression of the view. Alas, the latter looks very little like what might be seen from most urban sites! Each map is accompanied by lists of interesting objects, again with little regard to the theme of the book.

It would have been more helpful to explain in greater detail the practical consequences of stellar magnitudes, the effects of atmospheric pollution on seeing, and to have expanded on the many considerations for anticipating what may or may not be visible. Details of the chances of seeing (for example) a faint galaxy are extremely optimistic. To describe M33 (again, for example) as . . usually very hard to make out from the city" is inadequate. "Impossible" would be more accurate.

Armed with more detail on the likely loss of visibility, the reader could pick up any other book on beginning astronomy and get much more information. The final chapter on "Helpful information for the urban astronomer" is also general, but is not designed for urban observers. It is pointless to advise waiting 15 minutes or so to become fully dark adapted. It is the impossibility of ever being "dark-adapted" that is the bane of urban astronomy. This chapter also lists forthcoming lunar eclipses, but not solar! Although there are only a few really worthwhile total eclipses of the Sun to look forward to over the next 20 years, there will be several partial eclipses, and they at least present little problem from urban locations. The dimming effects of the atmosphere might even be an advantage!

The book concludes with a scrappy further reading list, which is also largely unrelated to the purpose of the book, but it has a good index.In short, the purpose for which the book is intended is very good, but it should have stuck to that purpose - and left enough change to put towards buying *Discover the Moon* (see above), for example. **RAK**

A Walk Through the Heavens: A guide to the Stars and Constellations and their legends (3rd edition). Milton D. Heifetz. Cambridge University Press. 87pp. Illustrations (spot colour). ISBN 0 521 54415 7 paperback. £8.99.

There have been no changes from the first editions, it appears. This is an ideal starting astronomy book for primary age readers. As well as the guide to the sky, and ways of observing it, and the "mythology" and other tales associated with the constellations are given. Some of these are a bit fanciful and unfounded in classical sources, but what does that matter?

Of ghoulies and ghosties . . .

Minolta XG9 SLR 50mm lens using Fuji 800 ASA print film. Approx. 25s at f1.4

Peter Ford sent us a dramatic evening sky photo taken in February (left) showing the Moon and Venus, which caused some interest in how photographic "errors" can result in some confusion. He writes: *This was a pretty, but astronomically unremarkable sight. But the photo has a few interesting features. The Moon was a crescent but it appears full owing to brightness and/or slight camera shake.* (Actually I think it is simply the effects of overexposure of the Earthlit-Moon, inherent in this type of photograph: Ed.) *Below and to the right of the main grouping you can see the true crescent as a reflection within the lens, which I did not see in the viewfinder. This just goes to show that while cameras tend not to tell overt porkies they can be devious!*

Yes indeed, Peter, and thanks for the photo - keep them coming. But what I want to know is what is that fiendish looking thing creeping over the horizon on the right. It could have been an attack of the Phantom Giant Praying Mantis!

The photo happened to tie in well with some slides I keep in my collection for use in talks and classes where I address the question of UFO's. In the last issue, two ☞

Letter from Down Under

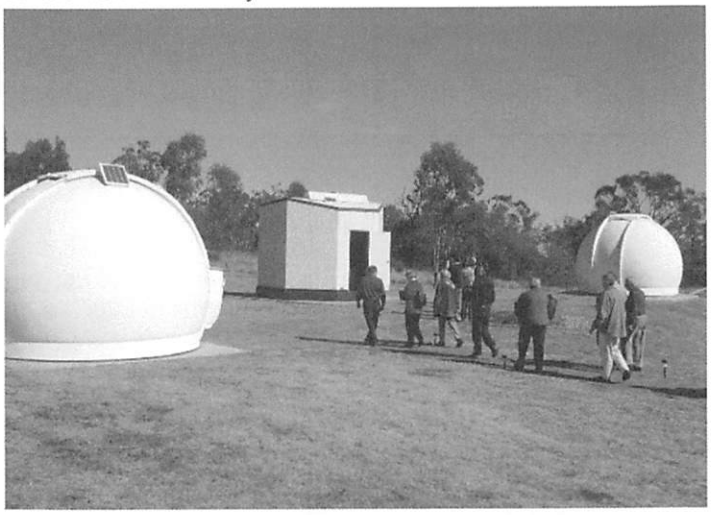
The Astronomical Society of Australia (ASA) held its 2004 Annual Scientific Meeting in the first week of July. This year, the venue was the University of Queensland in Brisbane, where the astronomy group is being rejuvenated under the leadership of Dr Michael Drinkwater. Australian astronomers didn't need too much enticement to come to the warmer climes of Brisbane and escape mid-winter in the southern states! Nevertheless, a comprehensive and interesting programme was organised, covering virtually all aspects of astronomy carried out by the Australian community.

Preceding the ASA meeting each year is the Harley Wood Winter School for graduate students, usually held at a location close to the ASA meeting. This year's School was held in the Gold Coast resort town of Coolangatta, and had the theme of "From our Sun to the Milky Way - and Beyond!", allowing the more than 40 students to hear talks from local experts on topics ranging from "Cosmology to Astrobiology" (all in the one talk by Charley Lineweaver), to "The Astronomy Job Market: Dark Secrets Your Supervisor Never Told You".

One of the most important aspects of the school is the chance for students in diverse research areas and institutions to socialise and get to know each other, and the speakers, since the future of Australian (not to mention worldwide) astronomy is in their hands. Thus, most of the talks were held in the morning and late afternoon, to allow time for liquid-related activities...

From Coolangatta, many of the participants made their way to the ASA meeting via some hinterland wineries. The conference opened with the Allison-Levick AAO Memorial Lecture, given by Professor Richard Ellis, Director of the Caltech Observatories. Richard spoke of plans underway for a giant 30-50m diameter optical/infrared telescope to be built by Caltech, the University of California, and the US National Optical Astronomy Observatory. While the technological challenges are daunting, and the budget perhaps even more so (don't expect much change from a billion US dollars), it seems almost inevitable that such a telescope will be built by this consortium (and/or the European Southern Observatory) within the next 10-20 years. Australia would dearly love to be a player in such an Extremely Large Telescope, and risks losing its place at the forefront of world astronomy if it does not.

To that end, one of the most important sessions at the ASA meeting was to kickstart the Decadal Review. Back in 1995, the ASA organised a set of working groups to collate the current status of astronomy research in Australia, and set priorities for where Australia should be by now. Out of this process came the impetus for a high-frequency upgrade to the Australia Telescope Compact Array, an Australian share of the twin 8m Gemini telescopes, and an active developmental role in the Square Kilometer Array, all of which have since borne fruit. Now the community needs to come together and focus on where it hopes to be in 2015. Forecasting the future is never easy (for instance, back in 1995 no-one thought that 71% of the Universe might consist of "Dark Energy"!). But by identifying key scientific questions that still need answering, and the technology that will enable those answers to be found, Australian astronomy will be ready to act the next time government recognises the value of a major investment in science.



Guests at the Mount Kent Observatory near Toowoomba in Queensland head towards the Jim O'Mara robotic telescope, in the octagonal rotating building (centre).

Among the other keynote speakers were Prof. Don Melrose, who gave the Ellery Lecture on "Maser Emission in Astrophysical Plasmas", and the AAO's new Director, Dr Matthew Colless, who gave the Harley Wood Public Lecture on "Surveying the Universe". There was a healthy number of talks given by graduate students at various stages of their studies, as well as a session highlighting some recent scientific outcomes from Australia's share of Gemini time. Plans for a new "Skymapper" telescope for Siding Spring Observatory were presented, along with new instrumentation concepts from AAO staff. Some very professional looking posters enabled those who could not be given a speaking slot the opportunity to present their work in a less-formal environment over tea and coffee.

At the conclusion of the ASA meeting, a few attendees took the opportunity to pay a visit to the Mount Kent Observatory, a facility operated principally by the small but dedicated astronomy research group at the University of Southern Queensland at Toowoomba led by Dr Brad Carter. A special ceremony was held to mark the significant contribution of the late Dr Jim O'Mara to establishing the observatory, and a new fully-robotic telescope was named in his honour . Clearly, astronomy in Queensland is making great strides, giving us more reasons to go there than just the great weather!

Stuart Ryder
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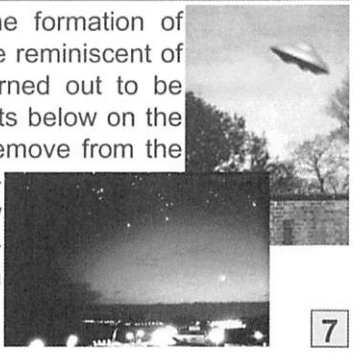
. . . and long leggedy beasties?

☞ of these were shown with the challenge to all readers to try and explain what they were. I was obviously totally successful and fooled everybody: not a single remotely correct reply arrived. In fact, not a single incorrect one arrived either!

The top one was a deliberate fake. They were easy to produce, even in the days before PhotoShop. This one was a hastily produced model, the picture being taken with a very cheap box camera. The formation of UFO's in the slide below were reminiscent of Peter's photograph. They turned out to be reflections of the artificial lights below on the u.v. filter I had forgotten to remove from the camera. In close up, the formation can be traced below and upside down! The overexposed crescent Moon appears here too!



☞ (continued from page 5) though well spread out. On the morning of the new year about 07:40 (on New Year's Day at that time you can really sort out the keen astronomers from the couch potatoes!), some three quarters of an hour before sunrise, Venus will be found low (about 6°) in the south-east 1° below Mercury. Mars will be about 15° from this pair and, at magnitude 1.6, very difficult to spot, particularly as it will be in the claws of the Scorpion, close to, but certainly no rival for Antares close by. But it might be located by looking about 1° south of β Sco. in the top corner of the "fan" of the Scorpion's claws. Jupiter will be easy to spot near Spica (follow the *arc* of the Plough's handle down through *Arc*turus and continue down to Spica and Jupiter). Continuing westwards, the waning crescent Moon will be found next, and finally Saturn, almost in line with the Twins.

The Full Moon of October 28 will become totally eclipsed, with first umbral contact at 01h 14min UT, and mid-eclipse at 03h 04min UT. The whole event will be visible from the UK, Spode's Law permitting. Full details are on Fred Espenak's website:

//sunearth.gsfc.nasa.gov/eclipse/eclipse.html.

The corresponding solar eclipse on October 14 is partial only, and, apart from the northern Pacific Ocean, even that is visible only in northern areas of eastern Asia. The next few years are going to be a bit disappointing for keen solar eclipse fans, as indicated in "Curriculum Corner" (see page 4).

Moon phases for the fourth quarter of 2004

Month	New Moon	First Quarter	Full Moon	Last Quarter
October	14	20	28*	9
November	12	19	26	7
December	12	18	26	6

* total eclipse 03:04UT

On November 5 (not usually the best day for looking at the night sky, but this is in the morning sky!) the planets Jupiter and Venus will be within about half a degree of each as they rise in the early hours. The waning Moon will be close to each of these planets in turn on November 9 and 10, and close by Mars on the next morning.

The evening of December 13 is the expected peak of the Geminid meteors, generally acknowledged as one of the most reliable so-called showers, with good opportunities for photographs. The evening of this day should be particularly favourable, with no Moon to interfere. The radiant is very close to Castor (α Gem.). By 22.00hr on this evening, Castor is due east and at an altitude of about 40°, depending on your latitude. Pollux will also be due east, vertically below the other Twin.

Actually, the "Twins" are not at all twin-like. Castor is also a good example of where the procedure of labelling the brightest star in a constellation "alpha", the next "beta" and so on is not followed. Castor is a binary star with an orbital period of about 500 years and, at a combined magnitude of the binary components of 1.57 is easily seen as fainter than Pollux, labelled β, which is magnitude 1.14. In the star brightness league tables, Pollux rates 17th in the whole sky, and Castor is 23rd. In addition, Castor's two main components are both Class A stars, very white in colour, compared with Pollux's class K, yellower than our own Sun. So much for Twins! However, the constellation is very interesting, and with Saturn at magnitude -0.2, and south plus a tiny bit west of Pollux at a slightly larger separation from that star than the angle between the Twins, they form a wonderful trio.

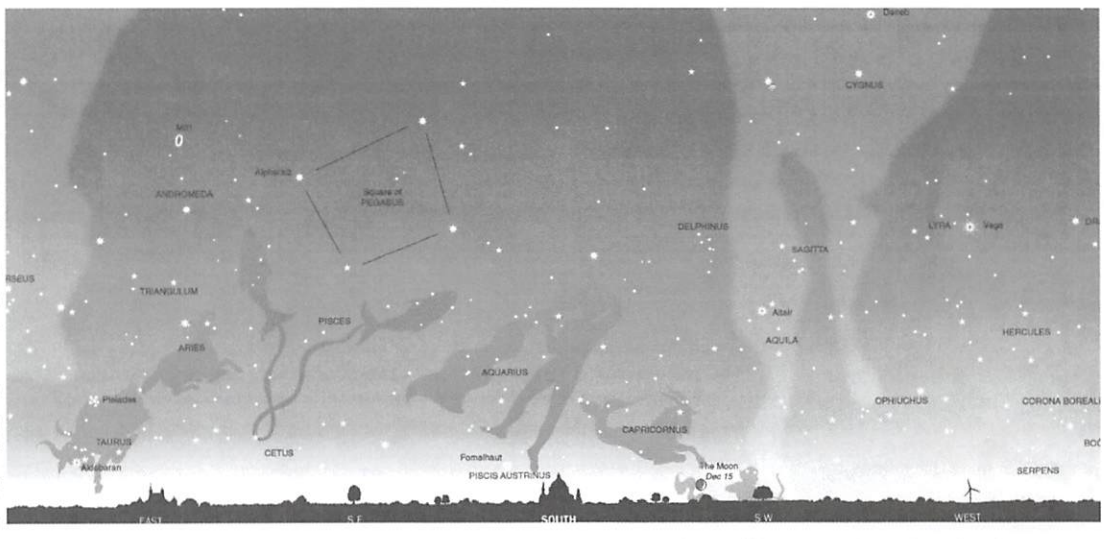
Rising and setting times (UT): lat. 52°N; long. 3°W

	October 15		November 15		December 15	
	Rise	Set	Rise	Set	Rise	Set
Sun	06h 37m	17h 17m	07h 32m	16h 20m	09h 13m	17h 00m
Mercury	07h 16m	17h 29m	09h 47m	17h 02m	08h 15m	16h 40m
Venus	02h 54m	16h 17m	04h 23m	15h 22m	06h 53m	15h 43m
Mars	05h 39m	17h 03m	05h 34m	15h 36m	06h 32m	15h 23m
Jupiter	04h 53m	16h 51m	03h 26m	15h 00m	02h 58m	14h 14m
Saturn	22h 28m	14h 29m	20h 28m	12h 29m	19h 28m	11h 32m
Uranus	15h 49m	02h 03m	13h 47m	00h 00m	12h 53m	23h 04m
Neptune	15h 03m	00h 08m	13h 01m	22h 03m	12h 08m	21h 12m

Make the most of Saturn if you have a telescope, as it now begins to move south more rapidly as it moves away from the solstitial position (just as the Sun does as the equinox approaches). As a result, we cannot see Saturn's south Pole as clearly as as been possible over the last few years, and the rings begin to close up once more. At the beginning of this year the apparent ellipse of the rings engulfed the disc of the planet itself. During the autumn, the planetary disc is just beginning to bulge outside the outline of the rings. It is a sobering thought for some of us (!) that Saturn will not be seen in its northernmost position in the sky for another 27 years, so make the most of it while it is so favourably placed.

Gemini also is home to M35, a prominent open cluster at the western end of the constellation with long strands of stars, with more distant and fainter NGC2158 close by to the southwest. Also the "Clown Face" or "Eskimo" planetary nebula, Caldwell 39, or NGC 2392 is worth a try. At mag. 8.6 and 15" diameter it needs 100 times magnification or more. It is about 1° south east of 5th magnitude 63 Gem. which in turn is just over 2° east and a little south of δ Gem. The nebula is also about 5° west of Saturn in December.

Richard Knox



The night sky at 18.00h, two hours after sunset, looking south, as illustrated in colour in the new Hawthorn Publishing **Stargazers' Almanac 2005** *(slightly modified to show the correct position of the Moon, and the absence of Mars in 2004), see the review on page ? in this issue.*