GNOMON

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Marginalising astronomy education?

From the new Key Stage 3 science strategy, it appears to me that astronomy education has been largely overlooked or, at the very least, even more marginalised than at present!

The five key scientific ideas that underpin the Key Stage 3 programme of study are cells, interdependence, particles, forces, and energy.

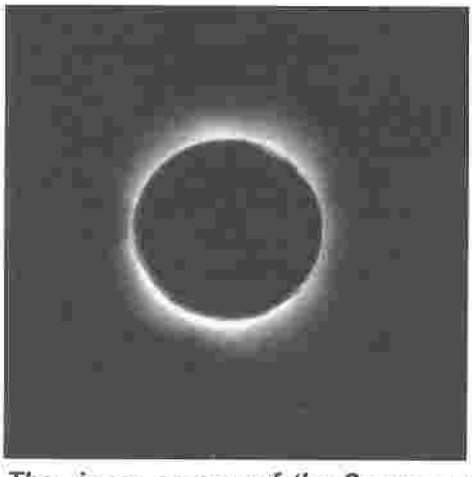
Searching through the literature and the relevant web sites, the only reference to astronomy education I can find is contained within *forces* where the following needs to be covered: properties of magnetic materials; friction in liquids and gases; the turning effect of forces; the relationship between force and pressure; and the movement and position of the planets in the solar system.

The "Yearly Objective" includes that, at the end of year nine, students: recognise that gravity is a force of attraction between objects, that this force is greater for large objects like the Earth, but diminishes the further an object moves away from the Earth's surface; use these ideas to explain how weight is different on different planets, and how stars, planets, and natural and artificial satellites are kept in position in relation to one another.

What effect will the new strategy have on the teaching and learning of astronomy in schools? Ideas, ways forward? Any response to the strategy?

Graham Bone

Oz eclipse dragon swallows Sun for 27 precious seconds



The inner corona of the Sun seen from Australia during the total solar eclipse of 2002 December 4 (see page??). The photograph, taken at bout 10 seconds after second contact, shows the chromosphere as a bright arc extending round the limb of the Moon from about 9 o'clock to 3:30, and a band of prominences about 10° wide and centred at about 1 o'clock. The short (27s) totality was due partly to the close fit of the Moon's disc across that of the Sun at this point in the eclipse track, giving a rare view of the chromosphere extending almost completely around the Moon's disc. (Photo: Annette Knox)

. . . and more let downs

Reading Peter Ford's article in the Winter 2002 issue of *Gnomon*, on Guides' and Brownies' experience of the night sky, indicated what dedicated adults can do to enhance children's appreciation of astronomy. Sad to relate, though, the Astronomer Badge has recently been abandoned. No mention of it now appears in their updated handbook.

I visit many cub packs, and have spoken to leaders about this. One does not have to look far to see the principal reason for the demise of the badge: the Government, which decrees that all children will learn about "the wider universe" in a compulsory National Curriculum, allows the stars to be hidden from the vast majority of those children by wasted upward light. Only on rare visits to rural areas (themselves not immune from poorly aimed lighting) can our heritage overhead be properly appreciated.

Bob Mizon

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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.

Apologies for lateness (you were warned)

The Editor was swanning round Australia prior to and after observing the eclipse of the Sun on December 4 (see facing page), thus hopelessly missing the usual early press date for *Gnomon* (because of the Christmas holidays). I'll try not to let it happen again. At least - not this year!

A happy and successful New Year to you all.

A degree in amateur astronomy?

The UK's first degree in "Astronomy and Space", aimed at amateur astronomers and people interested in actually doing astronomy rather than learning complex physics and maths, has been launched at the University of Glamorgan.

Dr. Paul Roche, who is now based there, says that the University has a very strong "widening access" brief, and has identified astronomy as a key hook for attracting students into science, maths and technology-based subjects, particularly adults returning to education. The University also reports on the success of its unique Science and Science Fiction degree on the website :

www.glam.ac.uk/newsevents/current/scifisuccess.php

Mars and NAW get closer

Although August might seem quite far away at the moment, put a date in your diary now.for National Astronomy Week - August 23 to 30.

During this week, on Wednesday, Mars will be at its closest to Earth since records began, certainly since the invention of the telescope! At just under 56 million km it will have an angular diameter of more than 25arcsec. Co-ordinator for NAW 2003 will be the Herstmonceux Science centre:

ww.astronomyweek.org.uk.

Pam Spence
Chairman NAW 2003

John Leslie White (1911-2002)

Among the people who shape our lives, it may be mostly our family and friends that shape us, but there are chance meetings which have a profound effect upon our future careers, interests and destiny. For both the editor of *Gnomon*, and me, meeting Leslie White was such an encounter.

J. Leslie White was the astronomy tutor at the Morley College adult education evening classes in London in the late 1960's at which Richard and I met, and where our general interest in astronomy was forged into a lifelong passion. He was a Gentleman, of the kind that is so rarely encountered these days. Along with other students at his classes, among whom many lasting friendships were formed, he won a great respect, and we very much appreciated his friendship over the ensuing years.

The chance event that was to trigger Leslie White's own lifelong interest in astronomy was reading the book *Through my Telescope*, by the comedian and amateur astronomer Will Hay. This was during the 2nd World War while Leslie was training to become a watch repairer. He later took a shop in Ewell High Street to practice his art. He became an active observer, using an 8inch reflecting telescope in Ewell, Surrey. Although, like most of us, he made few notable observations, he began making an increasing number of contributions to journals and publications. He also wrote a section on "observing the minor planets", as the asteroids were called then, in *Practical Amateur Astronomy*, the definitive British observers' book of the early 1960's.

J. Leslie White (third from left) at a 1995 reunion with a few of his Morley College class of 30 years earlier. (Photo: Annette Knox)

He began teaching astronomy at the 'City Lit', taking over from Ernest Noon, a founder of WEA astronomy evening classes. For over thirty years, Leslie taught classes in Brighton, Worthing, Southampton, Morley College, and other places. Through his popular classes and various entertaining weekend courses, he inspired enthusiasm among his students and encouraged hundreds of people to become interested in astronomy and to observe the night sky. Countless others eagerly waited each month for JLW's "Night Sky" column in the *Daily Telegraph* from 1965 until 1993.

He was elected to the RAS in 1948 and he also joined the BAA, which was to play a major role in his life. He became the BAA librarian, a post he held for some 40 years before becoming the BAA Assistant Secretary (full time administrator) for several more. He was elected BAA President from 1978 to 1980.

In 1967, in a tower that was all that remained of the church that once stood next to Morley College, he built a teaching planetarium using a Goto Eros projector, under a 4m umbrella dome. He was a pioneer of the small planetarium, few, if any, existing in the UK then. He used this projector as a teaching aid with his classes well into the 1970's. I looked after the projector in the early 70's and the friendship I established with Leslie at that time continued until his death this autumn. When he finally gave up teaching in the mid 80's, I became keeper of his planetarium equipment which is now integrated into the Island Planetarium on the Isle of Wight.

Leslie always maintained his interest in astronomy, regularly attending the BAA monthly meetings until the late 90's. He continued his fascination with the Greek philosophers and his interest in languages until his death. He attended a Welsh-speaking Anglican Church in Sutton and was learning Maori when he died.

It was a privilege to know Leslie White. He was well respected and held in fond affection by his many friends and acquaintances. He made a great contribution to the understanding and popularisation of astronomy, a true amateur in the literal sense of the word, over some fifty years. He touched the lives of many and enriched most of them: an epitaph that any teacher might wish for.

Paul England

An eclipse of the Sun to remember

There had to be some payback for going to the middle of nowhere to arrive almost at the end of the track of the Moon's shadow of the 2002 December 4 total eclipse of the Sun. The resulting shortening of the duration of totality from over 2 minutes in the middle of the Indian Ocean to 27 seconds increased the cost of this particular expedition to several hundred dollars per second of totality! Why did we do it? If you have seen a total solar eclipse, you will understand!

My wife and I are both self-confessed solar eclipse junkies, so the idea of not trying to see the 2002 total eclipse (the last easily accessible one till 2006) had not even entered our heads. The only question was "where?" We had decided many years ago that we would visit Australia around the early part of this decade, and our trip to Zimbabwe in 2001 to see the June 21 eclipse (*Gnomon* Vol. 21, No.1) had been wonderful, so a return to much the same area of Africa, especially in the deteriorating political climate, seemed a less attractive option. The long planned trip to Australia was an obvious way of combining both requirements. So that is why this issue of *Gnomon* is so late.

Stills from the video: 2nd contact; totality; 3rd contact; sunset (lower 4 frames).

It turned out to be a good decision: not only did the desert around Lyndhurst, South Australia, have about the clearest view possible of this eclipse, but it had the splendid bonus of watching the partially eclipsed Sun set afterwards. The trip into the outback to observe the eclipse was organised by two stalwart eclipse chasers, one of whom is New Zealander Stuart Ryder who works at Sidings Springs Observatory and writes our "Letter from Down Under" (see page 7).

The site they chose for the big day was in the middle of nowhere, some 35km north-west of the outback "town" of Lyndhurst on a private ranch which, we were informed, covered an area comparable to that of Belgium!

Lyndhurst announces itself as one enters from the south with a roadside notice "Welcome to Lyndhurst. Pop. 30 (most days)". On the other side of town the road divides, and both spurs end. The dirt tracks that continue are introduced with notices warning the driver of how many hundreds of kilometers it is to the next refuelling place. However, Lyndhurst's "Pop" had been expanded some 4000% with the invasion of hundreds of happy hippies who were celebrating the eclipse with a three-day "musical" happening of some sort which, at 35km distance, we were fortunately not going to hear very clearly.

Lyndhurst was coping well, with excellent temporary facilities, in addition to its own very well-appointed public ones! Although deep in the outback, during one of Australia's longest droughts on record, the town had quite a lot going for it compared with the hard stones and saltbrush of the side of a hill called Ideaka, where we were camping for the next night, following the eclipse. After an amazing drive across the desert in a huge 20-seater 4 X 4, (in which we all spent the time bouncing, averaging some 6 inches above the seats) we reached the base of the hill, and were told to find our own patch of ground "free of stones" to pitch our tents. The surface out there actually resembles the surface of Mars as seen from the landers, and freedom from stones and hefty blocks is comparable to the abundance of gold nuggets all around!

The most popular Australian eclipse site was Ceduna, on the coast of South Australia. At the last minute it was forecast to have thoroughly cloudy skies, (but at the crucial time, I believe, a partial clearing allowed at least some of the crowds there to see something. It did not appear too clear in the next day's newspaper photographs). In our deserted outback site, the weather had remained cloudless. Our main problem was wind, which had been fierce all day, and in the event did not abate much till well after sunset.

As eclipses go, this one was spectacular, even at an altitude of only 4° above the horizon. On the top of Ideaka Hill we had effectively a true horizon to make the most of each precious degree. Being so short, there was no chance of trying to observe all the usual eclipse phenomena like shadow bands, or the visibility of any planets or stars. There was not even any wildlife in which to observe reactions.The increase in wind which is noticed just as totality approaches at some eclipses might well have occurred - but we were all fighting what seemed like a hot force 8 gale anyway!

With such a precise fit between the apparent discs of the Sun and Moon, an extended pink chromosphere was visible almost all round the disc throughout the eclipse. Many prominences were visible, although they had subsided from the spectacular display seen earlier in the evening through an Hα filter on a 4in Schmidt Cassegrain brought on the trip by one of our group. The corona was very compact, as has been common in recent years close to the maximum phase of the solar cycle, with some prominent spikes that almost turned the inner corona into a rectangular shape.

It was also spectacular to see the eclipsed Sun against the background of the close horizon. For observers from, and used to the northern hemisphere skies, there was the intriguing speculation of what the combined motion of the Moon in its orbit, and the Earth on its axis, would do to the appearance of the setting Sun. It was a chance to observe both at once! After the "high" of totality, the partial phase after third contact goes unregarded, except by the most die-hard enthusiasts. This time it was different: only 25 minutes after third contact, the Sun set, still partially eclipsed. With upturned "horns", the tips of which were at different altitudes, we were able to watch the eastern side become cut-off from the western side of the Sun by the horizon. This right-hand side set first, leaving a blood red shark's tooth shape visible on its own for a few seconds before it too set.

If you have not yet seen a total eclipse of the Sun in a clear sky, you will not yet understand the apparent addiction of those who have. This year, eclipse junkies will be severely tested, as prices for expeditions to view the next total solar eclipse (either from the sea or by air) that takes place almost entirely over the Antarctic continent, or close to it, seem to start at about $18,000 per person. So see you in Turkey, 2006 March 29.

Richard Knox

CURRICULUM CORNER

Some schools competition samples

The South Tyneside College Planetarium work hard to come up with a new children's competition each term. This seems a very useful efort, and any of our readers who can come up with any ideas please e.mail them to the editor and they can be passed on through these pages and will be much appreciated.

Among the latest was a competition to come up with an alternative name for the constellation of the Hunting Dogs, Canes Venatici. Among the entries were: Planet and Arium; Sky and Sparkle; Startracker and Warp; Neil and Armstrong; Fireball and Starshooter; Starlight and Starbright; and Comet and Asteroid.

There were lots of the "Pluto and Neptune" type of entry, not to mention a few "Spot and Rover" suggestions (South Tyneside College's Eva Hans thinks that Spot might have got a prize had he been accompanying Jupiter!).

And the winner, as they say while opening the envelope, was six-years old Susannah Luglis, who would like to replace Bootes' two faithful hounds "Joy" and "Starry" (Chara and Asterion) with "Kirk" and "Spock". That seems eminently logical.

A new Roald Dahl?

The second competition was an essay-writing project of the subject of Uranus and one of its satellites, Miranda. The Editor, who likes a bit of surrealism, offers this as a sample::

Miranda and the god of the starry sky

By Ailsa Hemphill (Archbishop Runcie CE First School, Gosforth. Class of 8/9 years old)

Not many people liked Miranda. She was very ugly, unlike most of the girls who lived nearby. The only thing pretty about her was her name. (I think you'll all agree Miranda is a pretty name). She had short, scraggy black hair and small beady blue eyes, a pale face and thin lips. And to top all that off, she was naughty in every way she could be. So you can imagine how unpopular Miranda was.

Miranda did not mind this though. Not at all! She just carried on being just as horrible as ever.

She was horrible!

One day, Uranus, the god of the starry sky heard about Miranda. He decided he would set out to find this mischievous little girl.

On his travels, Uranus met a man and asked him if he knew where Miranda lived.

The man suddenly turned very pale, and looked scared. "In Cairo" he replied. "She has been doing some very bad things lately. I'm getting worried".

"What like?"

"Well, she has been damaging pyramids."

"Damaging pyramids?"

"Yes" said the man "Once she tried to break into one."

"Really?"

They chatted for a while and then Uranus said, "Well, I must be off to Cairo. Goodbye."

"Goodbye."

So Uranus set off to Cairo and there he found Miranda.

"I am going to do something so horrible, you'll never forget it. Not in all your born days!"

"What?" Miranda said cheekily.

"This!" Uranus picked her up and threw her into the air. Miranda curled up and clung to Uranus, which sent him flying up into the air with her.

And that is how Uranus the planet and its closest moon Miranda came to be.

How children observe the Universe

The New Zealand science curriculum requires astronomy to be taught at least every two years throughout the school. John Dunlop, the Senior Education Officer at the Auckland Observatory, New Zealand, was interested in finding what ideas children had about night and day, orbits, seasons and phases of the Moon, when they came on a school visit to the observatory. As part of his Masters thesis he made a survey of a wide range of these children's views before and after observatory visits and discovered that most held views at variance with the facts, even *after* their visit!

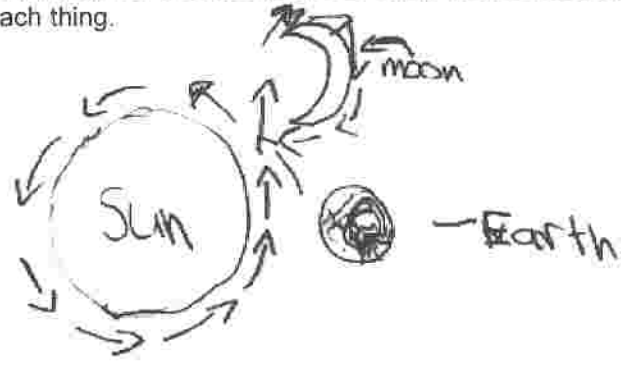
The following is based on extracts from John's research paper. It is clear that, if adults are to influence the children's idiosyncratic view of the universe they must interact with that view seriously, and show how the scientific model is superior. Correct ideas, taught in isolation are often added to an incorrect foundation, which leads to even more ingenious errors. Or the facts are briefly memorised to pass tests but not incorporated into the mental model that the person actually uses.

The following test shows up some common misconceptions. Give the list to a group of people and get them to put "true", "false", or "?" beside each.

The Sun disappears at night.
The Sun is always directly overhead at noon.
The Sun goes around the Earth.
The Sun goes around the Earth in less than a year.
The Sun will never burn out.
The Sun is not a star.
The Earth is round like a pancake.
We live on a flat place in the middle of a sphere.
The Earth is sitting on something.
The Earth is larger than the Sun.
There is a definite up and down in space.
The Earth's orbit around the Sun causes night and day.
Day and night are caused by the Sun going around the Earth.
Seasons are caused by the Earth's distance from the Sun.
Seasons are caused because the tilt of the Earth makes one part closer to the Sun.
The Moon controls the night.
Phases of the Moon are caused by differing amounts of light reflected from the Earth.
Different countries see different phases of the Moon on the same day.
The Moon makes light in the same way the Sun does.
Tides are caused by the Moon orbiting the Earth every 24 hours.
The universe contains only objects in our solar system.
Beings from another solar system have visited Earth.

Children's views of day and night

In John's study, two children had the Earth orbiting the Sun by day and the Moon by night in a figure of eight pattern. The question asked was: imagine you are out in space looking down on the Earth, the Moon and the Sun. Draw a picture to show how they would move. Show their orbits and label each thing.



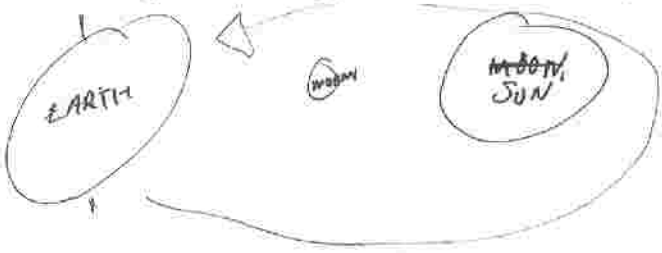
The question's second part was: write a few words to explain your picture. The artist wrote (sic): "the Earth does an orbit around the sun 24 hours and arround the moon 12 hours".

Several children had the Moon blocking the sunlight to cause night in a similar way to the Sun causing day. Even after teaching only 20% of children explicitly mentioned the Earth spinning or drew it spinning. One essential concept is that the half-lit Earth spinning daily is the only cause of night and day. Most of the children did not clearly show this. In a multiple-choice question 46% chose the option that the Earth revolving around the Sun caused day and night

Children's Views of Orbits

The belief the Moon orbits the Sun was expressed by 14% of the children and in a multi-choice question, 46% of the children chose the option that day and night were caused by the Earth going around the Sun.

Use drawings to explain why you see these different shapes.



The second part asked: write a few words to explain your picture The artist wrote: the earth rotates on its axis; the moon rotates with the earth about the sun. The sun reflects light on the moon, and there are different phases as the earth rotates. An explanation where the Earth's spin gave different views of a Moon permanently between the Earth and the Sun (as above) was a rather reasonable deduction, given the large Earth, small Moon and the closeness of the two in the diagram she drew. This was no doubt derived from similar misleading diagrams in textbooks or the not-to-scale model used at the Observatory.

How should we teach?

It is important to give clear reasons to children for why scientific explanations are better than common misconceptions. For example, science teaches that the Sun is a star. However, in everyday experience it seems that the Sun is very different from stars. It is hot, bright, and associated with day while stars are faint and associated with cold nights. Until the great difference in distance is understood as the reason for this, statements about the Sun, as a star will not make sense to the learner. Encouraging children to reflect about their own thinking is more important than cramming in the maximum number of facts.

It would seem a good idea to present children with realistic models of the Earth-Moon-Sun system or they may well incorporate the inaccuracies of teaching aids into their thinking. We should also listen to them and take their ideas seriously, or they will probably squeeze bits of adult explanations into their own unique view of the universe.

The extensive research that John did on children's views on a whole range of astronomy topics is available from him at johnd@stardome.org.nz

Eric Jackson.

Light pollution in the planetarium

The International Dark-Sky Association, based in Tucson, Arizona, www.dark-sky.org has set up a sub-committee to investigate ways of sensitising planetarium audiences to the problem of light pollution. Anyone wishing to contribute to this debate should contact the committee chairman, George W. Fleenor of GeoGraphics Imaging (jetson1959@aol.com.)

Bob Mizon, co-ordinator of the British Astronomical Association's Campaign for Dark Skies, recently made a submission to the committee suggesting that planetarians can stress to their audiences that, over cities, towns and even small villages, our heritage of star-strewn skies is threatened. While some modern road lighting has started to be better directed, most private lighting is not designed to restrict emissions to the premises to be lit, however. This light "trespass" is a nuisance to many non-astronomers, too. The fact that light is not legally considered a pollutant like smoke and noise means that victims of light pollution have little redress, and the stars have no protection in law in most countries. Many people in planetarium audiences are becoming aware of light pollution, but their attitude is still too often that:

- Glaring lights and a glow in the sky over inhabited areas are the norm, and the problem is too far advanced to be remedied;
- Darkness is somehow unnatural
- Astronomers would like nothing better than to plunge the modern world into medieval darkness.

Skyglow can be vividly demonstrated in a practical way in a planetarium by showing all the stars, the Milky Way and perhaps a faint meteor against a truly dark background, and then with the use of a dimmer-switched lamp, and possibly filters, bring up the skyglow. "Here's the sky over a city in 1900/1950/2000".

It should be pointed out that both astronomers and non-astronomers have the same lighting needs. Good lighting, directed downwards and shielded to shine only where needed is compatible with a view of the stars. Wattages should be the minimum necessary for the lighting task to save energy if nothing else! A 100W bulb burning all night long for one year leads adds a quarter of a tonne of carbon dioxide to the total emitted by a fossil-fuelled power station.

Poor lights can create glare, meaning an uncomfortable and less safe night-time environment, distraction to drivers, and an aid to criminals, who can hide behind a wall of light while potential witnesses are dazzled. Light trespass, the emission of unwanted light into neighbouring premises, sets neighbour against neighbour, is also on the increase.

You can suggest some easy courses of action to your audiences. They can, for example, talk about skyglow with others, discussing its causes and wastefulness: the glow over every town is public and private money being wasted. Make sure your own lights respect the stars, and check that local councils and lighting engineers have heard of the problem and realise the part they can play in its alleviation.

Finally, a few punchy one-liners may stick in their minds

Using a 500W lamp to light your garden is like watering a flower-pot with a lawn sprinkler.

Who benefits most from an all-night light in your back yard? Is it you, fast asleep indoors, the police officer miles away, or the burglar sorting out his tools behind your house?

God divided the light from the darkness. We are mixing them up again!

The starry sky: the only Millennium Dome we *really* need.

FOR YOUR LIBRARY

Star and Planet Almanac 2003, a monthly guide to the sky at night: *16pp 426 X 293mm full colour spiral bound, with monthly calendar. Created by Liesbeth Bisterbosch and translated from German by John Meeks. Hawthorn Press. ISBN 1 903458 16 1. Available through Booksource, 32 Finlas Street, Glasgow G22 5DU . £11.99 + P&P.*

orders@booksource.net

The calendar/almanac introduced last year is more elegant than ever. Aimed especially at young observers, the almanac reviews highlights of the year (planetary positions, the sky visible after dusk, at midnight and in the morning just before dawn), events such as eclipses, and various calendar notes.

The 12 main monthly charts cover the sky from horizon to an altitude of about 75° and a complete circle in azimuth (actually overlapping slightly at the left and right hand ends of the chart, representing north. The charts are produced by Bert Stolker and Wil Tirion, and include again the original representation of the ecliptic and zodiacal constellations with faint graphical images of the zodiacal characters across the sky. This provides a simple and attractive graphic way of showing the changing aspect of the ecliptic.

Each chart is cross-referred to other months and times that show similar aspects of the stars. The charts are drawn with an attractive night-blue sky, with the glow of twilight indicated where appropriate (still omitted from the midnight charts of the mid-summer months) but the Milky Way is not shown. There are useful introductory notes about using the charts and for observing the night sky. There are also two appendices, with charts showing the overhead sky through the year, and a new article by Bob Mizon on light pollution and the Campaign for Dark Skies

This is an excellent aid for all sky watchers who want a quick reference of the present night sky, and an elegant addition to the décor into the bargain. Thoroughly recommended.

RK

Astronomy in Depth. *Gerald North. 248pp. 158 monochrome figures. Soft cover. Springer Verlag ISBN 1-85233-580-7. £16.95 (price to AAE members £13.56 incl. p.&p.)*

This book has been written, the publisher explains, specifically for school and college students. A title such as " ... in depth" might be off-putting, but, as the author says in his introduction, there are many books appearing on astronomy every year crammed with full colour photographs taken from space probes, the Hubble Telescope and so on. But few offer a full explanation of the topics being presented, especially if that involves even a little simple mathematics.

So this author has set himself the task of introducing the subject within a reasonable length and cost for the reader, but with an in-depth coverage of the subject matter. The book is intended to cover pre-university level astronomy courses, with numerical examples "to help students". How well has he succeeded?

The chapters follow a well established pattern, starting with the Earth as a planet, then explaining the main forms of observation, optical and radio telescopes, spectroscopes etc. The most important aspects of gravitational physics are covered before launching us into the planets of the Solar System, returning to its central star as a launch pad for a journey to the stars. A chapter on the celestial sphere intrudes at this point: I would have thought it followed naturally from the chapter on the Earth in space at the beginning of the book. So we are then guided through the nature and basic types of star, unusual stars, and the life cycle of stars. There is one chapter on galaxies, and the concluding chapter covers quasars, active galaxies and cosmology and cosmogony. All this is competently done, with only a few signs of the pressure for brevity the author had been set. The numerical work is really quite simple and basic, and should frighten nobody who has a genuine wish to learn a little more than might be gleaned from one of the many coffee-table books covering similar ground.

The description "in-depth" becomes a little stretched in the later chapters, as the author enters the minefields of disputed territories and unanswered questions! But these questions are there, and are answered, rather as our own *Query* might tackle them in a sort of question and (possible) answer form. In any case, the reduction of the "depth" of the book as the student moves deeper into the Universe, is in line with the stated pre-university level readership.

I have, over the years of reading books on astronomy, often turned to the explanation of the Earth's tides as a test of the clarity of the author. (It is frequently confused, and too often even so oversimplified, or poorly understood, that it is simply wrong!). The author in this case manages the explanation quite simply, and in relatively few words (the same chapter had already provided the Newtonian physics necessary to back up the explanation mathematically, but strangely this was not cross-referenced).

This is a useful book for students, and would also suit the teacher who may touch on astronomical topics during a science course. The style and content will allow the text to be revised in years to come as new discoveries and theories prove to make this necessary, and at a cost that is very appropriate for the target market.

Springer-Verlag offer all AAE members a 20% discount, with free postage and packing, on astronomy and space books. To obtain a catalogue, or order a book contact Mark Robinson, Springer-Verlag, FREEPOST (SCE11 244), Goldaming, Surrey, GU7 3BR quoting the special offer in *Gnomon* Vol. 22 no. 2

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A beginner's guide to the Universe *Andrew Conway and Rosie Coleman. 147pp. Full colour illustrations and photographs. Cambridge University Press. ISBN 0 521 80693 3 (hardback) £16.95*

This is a wide-ranging astronomy book, brilliantly written for 9 to 11 year ages, or thereabouts. The co-authors are an astronomer and a primary school teacher, and it shows in the result. The astronomical terminology is painlessly introduced, and material and ideas are presented in digestible chunks. For example: ". . . we all know that the Earth is a huge sphere (ball-shape) because . . ." and "The horizon (where the sea seems to meet the sky) is a clear line."

The reader is gently encouraged to actually do something, by suggesting simple experiments like star-trail photography, and learning the constellations. As far as the latter goes, an extensive chapter on some of the most easily identified constellations (some both north and south of the Equator have been included) might seem out of place in an astronomy book which covers everything from how we know the Earth is round to the expansion of the Universe and the life-cycle of stars, but does *not* get into the operation and use of small telescopes and other practical topics.

But teaching youngsters (and some of the older ones

too) about star patterns and names, and how to identify them in the night sky, is a very good way of getting them involved with the subject.

The authors are very well aware of common misconceptions that many young people have. For example, you might see a star-like point moving steadily and silently across the starry background. Ask the novice what it is and ten to one they will say a "shooting star". The book deals with this and many such points very clearly.

The high quality of the illustrations, the large number of them, and the inclusion of some of the very best photographs available suits the target readership well. The book makes quite clear that there are many unsolved riddles of astronomy and does not pretend that everything is sorted.

The book concludes with its own *Query*-style pages, by Professor John Brown, Astronomer Royal for Scotland, who has supplied the answers to common questions the authors have been asked during their teaching life.

The main criticism I would make of the book is that the title, front cover design and price are for some other readership! It is *only* for children ("Keep safe: Make sure your parents know where you are"). A title such as "Finding out about astronomy" might have been more suitable. It should better indicate that this book is aimed very skillfully at the primary school age group. The price should also have been fixed at a level such that more youngsters might have acquired their own copies. The book can be recommended strongly, however, for anyone looking for a present for a youngster showing signs of wanting to know more about the Earth in space, all primary science teachers, and for additions to school libraries. I would cheerfully predict that it will help to attract more than just a few young readers into becoming serious students of the subject.

Richard Knox

News from Down Under

As I sit here in Sydney typing this Letter, I am simultaneously operating the Australia Telescope Compact Array, located some 600km away. Thanks to a dedicated Internet link, and some sophisticated monitoring software, it is possible to carry out almost any type of standard observation with the array as if I was in fact sitting in the control room at Narrabri.

The only difference is that I cannot look out the windows and see the antennas actually moving! But considering the day's travel each way that I save by observing remotely, that's a small price to pay.

What am I using the array for? That's an intriguing story in itself. Exactly one year ago I was at the telescope site, while training a student in how to run it. Although the telescope is operated 24 hours a day (radio waves for the most part being unaffected by whether the Sun is up or not), there are occasional gaps in the schedule where no project can be accommodated.

Just as I was contemplating how my student and I might use this time to our own benefit, I was forwarded an e-mail from a colleague in the USA, Dr Kurt Weiler from the Naval Research Laboratory, whose special interest is radio emission from supernovae. He had just read of a newly-discovered southern supernova, SN 2001ig, and wondered if anyone had tried to detect it in the radio spectrum yet. Having had a passing interest in supernovae over the years, I offered to give it a go.

It's worth noting another Australian connection here, in that SN 2001ig was discovered visually by the renowned supernova hunter, the Rev. Robert Evans, using his backyard 12in telescope in the Blue Mountains west of Sydney. SN 2001ig was his 39th discovery, an impressive achievement considering the increasing number of robotic survey telescopes worldwide engaged in supernova hunting. SN 2001ig is located in the outskirts of NGC 7424, a late-type spiral galaxy only 40 million light years away.

Somewhat to our surprise, we did get a weak detection of the supernova at a wavelength of 3cm. Supernova remnants, such as the Crab nebula, are powerful radio sources, but only because the blast has had centuries in which to pile up enough material (like a snow-plough), creating a shock wave which emits copious amounts of radio and X-rays.

For such a young supernova to be this bright at radio wavelengths means that it must have been surrounded by a particularly dense cloud of debris - perhaps gas that was puffed off by the star before it went supernova, in a desperate (but ultimately futile) bid to stave off gravitational collapse.

SN 2001ig was not finished with surprises though. As we continued to monitor it once a week or so, it continued to get brighter at all wavelengths, since the expanding remnant thins out and we can see deeper into still-hot outer layers. But eventually, as the fireball cools, the supernova begins to fade at a fairly steady rate.

By now it might have faded from view were it not for the "second wind". In March, SN 2001ig stopped fading and instead almost doubled in strength, remaining fairly steady for a month or so before resuming its previous decline. In August, the supernova again temporarily paused its decline.

What could be going on? In all likelihood, the star which eventually exploded as SN 2001ig went through several "weight-loss" episodes late in its life. Now, as the shock-wave overtakes each of these shells, we see it as a bump in the radio "light curve". In watching the post-supernova radio evolution, we are in essence running backwards the clock of stellar evolution, allowing us to retrace the last "days" in the life of an overweight star.

And all from the comfort of my office in Sydney!

Stuart Ryder

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Sky Diary Winter 2003

The two most senior planets dominate the evening sky throughout the quarter. Closest to the setting Sun is Saturn which reached opposition on the last day of the Old Year, and so is still close to the Earth. It is also close to its maximum southerly axial tilt. If you look at the planet through a small telescope and reveal the amazing ring system, these engulf the disc of the planet itself completely. In other words, the outline of the planet and its rings is a perfect ellipse. This is Saturn at its best-seen from the northern hemisphere. It is as far north as is can get, and it will be just under 30 years before the planet returns to this position in the sky again. Add 30 years to your age and ponder on that!

Saturn is close to the Crab Nebula, M1, near the tip of the Bull's southern horn immediately above Orion's head, and is unmistakable. Of all astronomical sights that everyone should see with their own eyes at some time during their life, Saturn and its magnificent rings through a small telescope must rate among the top three. Jupiter and its Moon's are one of the other two, and they are around this quarter too! A total eclipse of the Sun completes the ☞ (*over*)

☞ (cont.) set and the last of those was only a month ago!

Jupiter is at opposition on February 2 in Cancer, about 6° to the east of Praesepe. Although Jupiter's ring system was only suspected before the Voyager missions, the planet is one of the most amazing of all those in the Solar System. The constantly raging storms of the gas giant's colossal atmosphere makes it an object of ever-changing aspect. Its rapid axial rotation, less than 10 hours, means that even in one evening, an observer can see most of the planet, and from day to day, and year to year there is an enormous amount to be seen, recorded and admired. Add to that the dance of the four satellites discovered by Galileo - and seen in even small binoculars - as they orbit the planet. Their orbits are roughly in the plane of Jupiter's equator, which is hardly inclined to the plane of its orbit compared with most of the Solar System planets. As a result, the four Galilean satellites appear along almost the same line that passes across and behind the disc of the planet in an ever-changing combination of positions, eclipses, transits and occultations.

Jupiter is by far the largest of the planets of our system, so, bearing in mind that Venus is very much brighter, it was very appropriately chosen by ancient sky watchers to bear the name of the King of the Gods. Its sidereal period, the time it takes to orbit the Sun, is just less than 12 years. The ecliptic, the apparent path of the Sun about the Earth each year was divided up by astrologers into 12 equal parts, thousands of years ago. Each of these astrological "houses" was named after a nearby constellation. Due to the precession of the Earth's axis about the ecliptic pole, the zodiacal "houses" have now moved quite some distance around the ecliptic from their namesakes in the constellations. However, as Jupiter moves almost exactly one twelfth of the way round the ecliptic each year, it can be expected to move by one "sign" of the zodiac each year also. So in these notes next year, Jupiter will be noted as being in Leo, the next year in Virgo and so on.

Moon phases for the first quarter of 2003

Month	New Moon	First Quarter	Full Moon	Last Quarter
January	2	10	18	25
February	1	9	16	23
March	3	11	18	25

The other planets are all appearing in the morning sky. Mars begins to take on a more significant brightness as the Earth begins to catch the Red Planet once more. Because of the relative closeness of Earth and Mars and consequently their sidereal periods, the rate at which the Earth overtakes Mars is comparatively slow, resulting in the longest synodic period of all the planets (the period in which the planet *appears* to take to go round the Earth.) It gives the mean time between successive oppositions or conjunctions of a superior planet, for example. Mars, at just less than 780 days (over two years) is the longest. By the end of the first quarter of the year Mars will reach magnitude 0.5 and it will be a comparatively bright object to the east of the Sagittarius "teapot handle", but so far south as to be awkward to get a clear view. By the end of March, Mars will be brighter than Antares, and make an interesting comparison with the red giant star in Scorpius, whose name means "Rival of Mars".

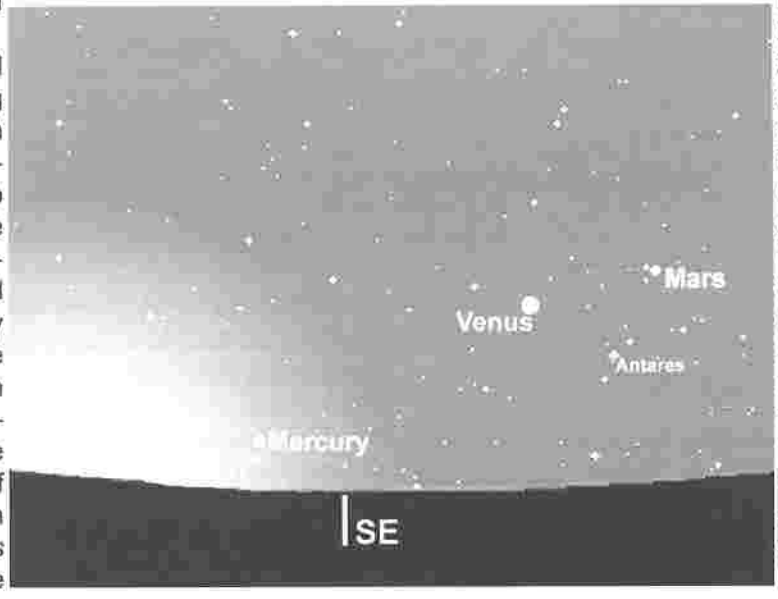
Rising and setting times (UT): lat. 52°N; long. 3°W

	January 15		February 15		March 15	
	Rise	Set	Rise	Set	Rise	Set
Sun	08h 13m	16h 29m	07h 27m	17h 25m	06h 27m	18h 15m
Mercury	07h 27m	16h 01m	06h 43m	15h 06m	06h 31m	17h 34m
Venus	04h 36m	13h 25m	05h 18m	13h 32m	05h 15m	14h 29m
Mars	04h 03m	12h 38m	03h 48m	11h 37m	03h 21m	10h 59m
Jupiter	18h 08m	09h 23m	15h 43m	07h 12m	13h 37m	05h 16m
Saturn	13h 55m	06h 15m	11h 48m	04h 08m	09h 58m	02h 21m
Uranus	09h 37m	19h 24m	07h 39m	17h 32m	05h 52m	15h 51m
Neptune	08h 56m	17h 50m	06h 57m	15h 55m	05h 09m	14h 40m

Venus will start with a brilliant -4.4 magnitude at maximum western elongation at the beginning of the quarter, when it rises nearly four hours before the Sun and will need no further identification. By the end of the quarter, its magnitude will have dropped to -3.9 as the planet moves further towards the far side of the Sun and superior conjunction (not till August). At the end of March, it rises less than an hour before the Sun.

Mercury may be spotted in the morning sky under the most ideal conditions (clear visibility down to the horizon) in early February when it reaches greatest western elongation from the Sun (February 4). By the end of March it will have passed superior conjunction and be beginning to swing east of the Sun to make its most prominent evening appearance of the year. More about that in the next "Sky Diary".

The stars and constellations, it almost goes without saying, are splendid throughout the winter. Having just returned from the antipodes where the northern winter bright constellations appear in a warm summer night sky, and to which are added delights such as Canopus, the Magellanic Clouds, Fomalhaut and Achernar (just to think of a few) my jealousy of southern sky observers has returned. To add insult to injury, there is little that we enjoy in the northern latitudes which is not also visible from Australia and new Zealand. A brightish Pole Star is about the only one I can think of! On the other hand, the Magellanic Clouds, the two brightest globular clusters, Omega Centauri and 47 Tucanae, the eta Carinae nebula, the Coalsack and, most magnificent of all, the brightest sections of the Milky Way are completely hidden from British latitudes. Mars at its closest oppositions is also about as far south as it can get, and even Mercury can be seen for a few days twice a year in a dark sky!



The three planets that might be spotted in the morning twilight sky of late January. Mars is close to ßSco. and Mercury is very low in the southeast. Venus is the best starting point

Richard Knox