GNOMON

Newsletter of the Association for Astronomy Education

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A grant from The Royal Astronomical Society enables "The Universe in the Classroom", the Newsletter of The Astronomical Society of the Pacific, to be sent to members with issues of "GNOMON".

ANNUAL GENERAL MEETING - STOP PRESS

Just as we go to the printers, the AGM was held enabling me to print the new list of officers. New President, Alan Pickwick thanked outgoing President, Anne Cohen, for her sterling work at a cosy, good natured meeting held at the University of Liverpool on 11th May. The AAE attendees were graciously entertained after the AGM by Liverpool Museums, and were delighted to see a planetarium show. By all accounts the sky was lovely and the show very informative.

The AAE wishes to thank the Federation of Astronomical Societies for allowing us to share in all their events and to part with our money at the numerous display and product stands. Their organisation certainly made the whole event a very enjoyable one for all who attended.

LIST OF OFFICERS 1996/97

President	Alan Pickwick	
Vice Presidents	Anne Cohen	
	Eva Hans	
	Mike Dworetsky	
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Asst Secretary (Publications)	Nik Steggall	
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	Paul Dearden	Liverpool Planetarium
	Bill Dines	Techniquest
Members	Sue Tritton	Francisco Diego
	Sarah Dunkin	Ian Crawford
Editor 'GNOMON'	Alexandra Lovell	(co-opted)

Council also has representatives from: BAA, BIS, RAS, SPA, FAS, and UKSEDS.

EDITORIAL COMMENT

Late spring and early summer seem to be filled with various conferences. Aside from our own AGM, the British Association of Planetaria holds their meeting in May and then we have the IAU colloquium in July. Reports on the latter two events will be in the next issue.

There is much going on around the country and I hope that some of you will follow up the leads in Gnomon and make use of these resources. Generally speaking, the idea of public understanding of science is something that is very much in vogue, with organisations like the Particle Physics and Astronomy Research Council (PPARC) and others putting aside amounts of money to support groups and individuals in their efforts to bring science out in to the wider forum. The next round of funding will be in September, so if you think you have a worthy idea that will benefit the public or a large group of school children it may be worth getting in touch with

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MEMBERSHIP of the AAE costs £7.50 a year for individual members, £15 for corporate membership and £5 for retired persons. For more information, contact Nik Steggall (address letters to: AAE, Royal Astronomical Society, Burlington House, Piccadilly, London W1V 0NL). Members receive 4 issues of GNOMON a year.

GNOMON - definition from the **Concise Oxford Dictionary:**
Pillar, rod, pin or plate of sundial, showing time by its shadow on marked surface; column, etc. used in observing sun's meridian altitude

Subscription Rates:

Individual Members	£7.50
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Corporate Members will receive three copies of *Gnomon*.

Extra Copies:

0-10	£1.00 per copy
11-50	£0.75 per copy
51-	£0.50 per copy

Back numbers, not less than one year old, half these prices.

There will generally be a 10% discount to AAE members on all publications and advertising rates.

Practising teachers may claim their subscriptions as an allowance against income tax, thereby effectively reducing their contributions.

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

The Association for Astronomy Education,
The Royal Astronomical Society,
Burlington House, Piccadilly,
LONDON. W1V 0NL.

Editor: Alex Lovell, Vaughan, Wistow Hall, Kibworth Road, Wistow, Leicester LE8 0QF - for all enquiries concerning the Newsletter.
(Tel 0116 259 2445)
Email: alexlovell@dial.pipex.com

Advertising Charges:

Whole page	£120
Half page	£60
Quarter page	£30
Inserts	£75*

* These may be of any size which may conveniently be inserted into the newsletter. There may also be an additional charge for posting if the inserts are heavy.

The prices are for *one* issue.
A 25% reduction is made for advertising in all four issues.

Publication Dates:

These are the equinoxes and the solstices, that is four times a year. Copy deadlines are two months *before* these dates.

FOR YOUR INFORMATION . . .

Herstmonceux Science Centre is open from 10 until 6 every day until 29 September and welcomes visits from AAE members. The Centre occupies the Equatorial Group of buildings of the former Royal Greenwich Observatory and is near Hailsham in East Sussex. It has a complete new set of hands- on exhibits on the themes of Forces and Gravity, The Earth, The Senses, and Optics.

Two telescopes are available to look at (but not yet through, alas) - the 38-inch 'Hargreaves' reflector and 26-inch 'Thompson' refractor, and a third, the 36-inch 'Yapp' reflector, is visited on conducted tours.

Although the Centre closes to the public on 29 September, special arrangements can be made to cater for group visits after that date.

To find out more, or to book a group visit, phone or fax 01323 832731 or write to Anthony Wilson, Herstmonceux Science Centre, Herstmonceux Castle, Hailsham, East Sussex BN27 1RP.

HIGH PROFILE SCIENCE

by Alan Pickwick

A student in my classroom - not something else to worry about - let's hope not.

Over one thousand postgraduate science students are going to make links with schools this year. Equipped with Pupil Research Briefs from Sheffield Hallam University, they will involve pupils in simple research projects. The Pupil Researcher Initiative also aims to raise the profile of science in schools - the Art Department puts on exhibitions, the Music Department stages concerts and the English Department produces plays - so why not Science Fairs? For the teachers, there will be placements in research laboratories. For physics teachers perhaps that could be on a mountain in La Palma or Hawaii. I hope that makes you feel better!

To find out more, contact the PRI team at Sheffield Hallam University on 0114 2532211.

LETTERS

Dear Everyone,

I would like to thank all those kind people who wrote to me or telephoned, with their good wishes following my 'retirement' on medical grounds from the Editorship of Gnomon. This was much appreciated.

Eric Zucker
Lewes, W. Sussex

Dear Editor,

I was somewhat surprised at the enclosed newspaper cutting, as England was way ahead of Australia in the business of getting Astronomy into the curriculum (thanks to the AAE).

> *"LONDON. A fifth of English Primary School children believe the Earth is flat. And of those who know the Earth is round, half believe that people in some regions have trouble keeping their feet on the ground, according to an Anglo-Australian study.*
>
> *Academics at Sussex and Queensland Universities found that in geographical understanding, English youngsters were falling behind their Australian counterparts. Almost all the Australian children were aware not only that the Earth was round, but that people could live anywhere without being in danger of 'falling off'.*

Australian children could also find England on a globe, but few English pupils could locate Australia."

Creswick, Victoria, Australia
The Courier, Ballarat, Wednesday March 20, 1996.
Karenza Burk

[Editor's Note: Any comments? Do you think the Scottish or Welsh children would have fared any better? Do you think we should write and tell the newspaper that the Australian children were probably locating the United Kingdom (or is that Great Britain!) on their globes!! - *Ed]*

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PPARC about applying for their small awards scheme.

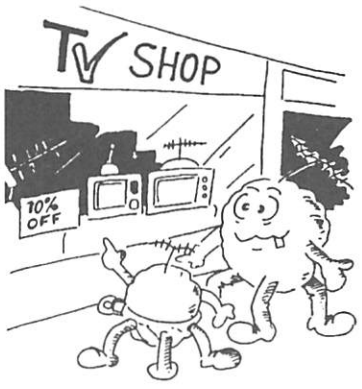
Discussions are currently under way for the AAE to have it's own web page where you will be able to access addresses, information, and probably Gnomon past issues electronically. We hope to have more to announce in the autumn.

And finally, please note that the editor has moved! Mail sent to the old address will still get to me via 'parental post', but for more urgent stuff, can I encourage you to use the new address. I'm going to be here for at least a year, I promise! As always, submissions are most welcome for GNOMON.

STOP PRESS

For a National Astronomy Week event list send an A4 s.a.e. to:

Jodrell Bank
NAW Events List
Macclesfield
Cheshire
SK11 9DL



Question
What did the baby alien say when he saw a shop full of TV aerials?

Joke by: Susan Chapple, Westfield School Junior House, Gosforth.

Courtesy South Tyneside College Planetarium.

Answer
"Look, Dad! A wig shop!"

FOCUS ON . . . PLANET: EARTH

Astronomy and Environment Centre, Swallows Barn, Bacup Road, Todmorden, Lancs. OL14 0HW.

Some of you might be looking at that address and thinking that it looks in someway familiar and for those of you that have dabbled in amateur astronomy, then it probably is quite recognisable.

Planet:Earth is on the same site as The Astronomy Centre (formerly Amateur Astronomy Centre) and utilises the expertise of Linda Simonian and John Keegan, expanding the original aims of the Astronomy Centre to include a much wider range of topics. This makes the place even more of a focus to its local schools as they can now find activities to suit many parts of the curriculum.

So, what activities can you get involved in at Planet:Earth? Well, if astronomy is your main aim, then you are well catered for. Open evenings on the first and third Fridays of each month, May to October at 7.30 pm are held in the lecture hall and for a small fee you can listen to a wide variety of lectures ranging from basic astronomy and geology to more speculative lectures on life elsewhere.

If you'd like to explore optics and telescopes and learn the basics of astronomy the attending some of the practical astronomy sessions may be for you. You can register for a whole year of these sessions which include practical instrument making, observation, experiments with light, computing, slide shows and many discussions. These sessions are accompanied by worksheets and notes so if you want to get ahead of some of the eager children in your class this may be the way to go.

During the summer, Astro:Kids can be found on the site taking part in such diverse activities such as bug and beetle racing and building bird boxes, as well as finding out about space and if you have a Guide or Scout troupe then this is also a venue for badge testing. As if all the above wasn't enough, there is a small Planetarium on site which takes visitors on a trip into space.

Planet:Earth offers currently two correspondence courses with more in the pipeline. By distance learning over two years you can do your Astronomy GCSE, and once you have that, an advanced course, originally from a local college, can be taken.

The scope for finding out and learning at Planet:Earth is quite vast and school groups will enjoy a visit there. Be warned however that the facilities are still under construction and warm clothing, stout footwear and a cushion will make your visit a great deal more comfortable.

More information on any of the activities can be found by writing to Planet:Earth at the above address or calling 01706 816964.

THE NORMAN LOCKYER OBSERVATORY . . .

. . . and James Lockyer Planetarium

Having focused on the North of England with Planet:Earth, readers may like to know that there is an equally admirable facility on the South Coast.

The Norman Lockyer Observatory was established in 1912 and has had a varied history. It sits on Salcombe Hill in Sidmouth, not far from the cliffs overlooking the channel. In the past few years much work has gone on at the site, restoring the splendid old telescopes for use and recently, in September 1995, a large new exhibition building and 60 seat planetarium was opened by Patrick Moore.

The site is run by members of the Norman Lockyer Observatory Society who provide expertise for visiting schools and groups and give shows in the planetarium.

For anyone who maybe visiting that part of the country on Holiday this summer, or who lives near Sidmouth, it is well worth a visit to the site.

So what activities can you and your school get up to on site? The Kensington telescope looks like a telescope as it is a big 10 inch refractor. This telescope is used for viewing the solar spectrum and on request it can be set up so that older students can take VHS of the moon and planets.

The McClean telescope has the benefit of a CCD for recording faint objects in the night sky which can then be viewed at any time on the computer. On sunny days, this telescope is used for viewing sunspots and for the public at night-time, the views of the planets are said to be particularly good.

A variety of other telescopes exist on site that are being refurbished. The Siderostat is being modified to allow solar and lunar observation by persons confined to wheelchairs.

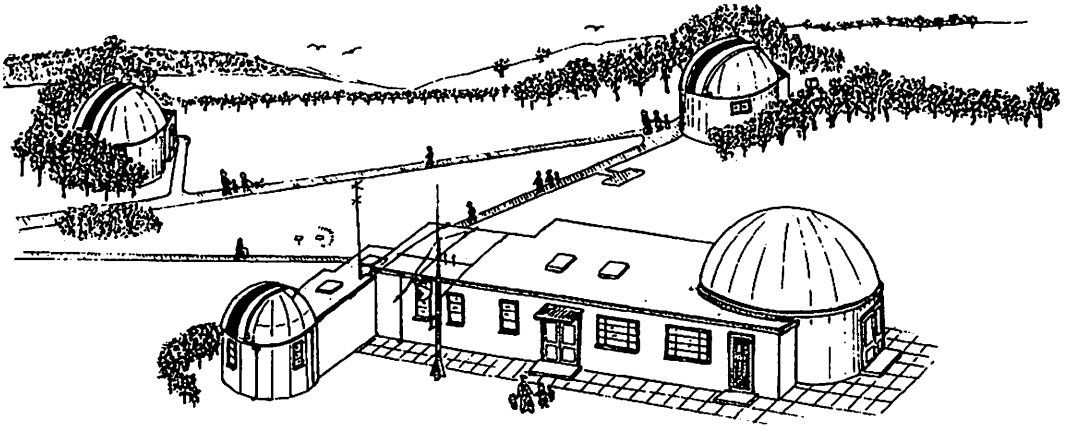
The latest event at the Observatory as mentioned, was the opening of the planetarium. This holds 60 people and the presentation can be tailored to the visiting groups. Public presentations depend on the presenter to judge the content and interests of the audience. Many of the slides used come from photographs taken in the Observatories.

Your visit would not be complete without a wander round the new exhibition hall. Here, displays on the history of the observatory and general astronomy can be found. You can also see pictures received by the sites Weather Satellite Receiving Station and check if you can return in the evening for a look through the telescopes.

The whole Observatory complex is situated in pleasant grounds. The grounds are being developed and conserved this year, but you can enjoy a picnic provided you don't mind the sea breeze!

For further information contact the Observatory by letter to: Norman Lockyer Observatory, Salcombe Hill, Sidmouth EX10 0NY, or call 01395 579941.

The Observatory is open to the public 2-5pm on Wednesdays, Sundays and Bank Holidays, mid-July to September. Admission is £2 for adults and £1 for children and students. Groups outside these times, please enquire.



drawing: Mike Davis

NET NOTES

Something a little different this month. Watch for our web page soon!

THE CRACKPOT INDEX

by John Baez

Introduced by Mike Dworetsky, University College London
email mmd@star.ucl.ac.uk

Many of you are starting to navigate the Internet and the World Wide Web. Some of the most popular stopping points are the Usenet Newsgroups, where many friendly people are happy to chat or answer questions about nearly every conceivable topic. There are several groups devoted to science, including those in the sci.astro and sci.physics collections. If you want to get an answer to a question, or want help finding out where to obtain resources or information, this is probably the place to start.

Your Internet provider should be able to help you to set up a newsreader. Watch and read for a while, and - the best advice of all - wait for the FAQ (list of Frequently Asked Questions and their answers) to be posted. Check whether your question is answered there before asking it. But beware, for here, in addition to many friendly people knowledgeable about astronomy and physics (and some not so knowledgeable), lurk the weirdoes, cranks and crackpots.

You may meet Archimedes Plutonium, who hails from Dartmouth College in the USA, who legally changed his name (so I have heard). Rumour has it that he is on the staff as a janitor. His theory is that the entire Universe is a gigantic 231Pu atom.

Or you may meet A. Abian, who is sure Einstein was wrong about whatever Einstein was surely right about, and who wants to provide extra land for our descendants by re-orbiting Venus into the Earth's orbit. I have had some fun with this one, by pointing out the dangers of two planets sharing an orbit - not just from collisions, but from the tides raised whenever the two bodies would pass close to each other. How increasing the land area available arithmetically would solve overcrowding in the long run, for an exponentially increasing population, is anyone's guess.

Of course, for a different perspective, you could ask an alien for help with your homework. There seem to be quite a few of these, most of whom pass on their advanced knowledge via mental projection to a lady named Nancy. They call themselves Zetas, which is not a very original name, but apparently they don't muck about with all these tedious laws of physics that mere earthlings have to obey - they can teleport wherever they wish without regard to space or time. With Nancy's help, they have been lecturing Earth astronomers about how we have got the new Hale-Bopp comet all wrong, and how we obviously know nothing about the true cause of tides (It's something about the water sloshing around in the oceans; they're not caused by the Sun's and Moon's gravity at all, or only indirectly. I couldn't quite figure out what Nancy - or, rather, the Zetas - were trying to say.).

(Interestingly, now that some of her predictions have not come true, Nancy has vanished - *ed*)

We could all use some assistance in distinguishing the merely badly informed from the true crank or crackpot. Fortunately, help is at hand in the form of an index compiled by John Baez of the University of California, Riverside, who graciously offers it for our edification. Any posting which you would award over 10 points should not be taken seriously; anything over 30 points means the contributor is in grave difficulties.

JOHN BAEZ'S CRACKPOT INDEX

(A simple method for rating potentially revolutionary contributions to physics.)

1. A -5 point starting credit.
2. 1 point for every statement that is widely agreed on to be false.
3. 2 points for every statement that is clearly vacuous.
4. 3 points for every statement that is logically inconsistent.
5. 5 points for each such statement that is adhered to despite careful correction.
6. 5 points for using a thought experiment that contradicts the results of a widely accepted real experiment.
7. 5 points for each word in all capital letters (except for those with defective keyboards). 8) 10 points for each claim that quantum mechanics is fundamentally misguided (without good evidence).
9. 10 points for each favourable comparison of oneself to Einstein, or claim that Special or General Relativity are fundamentally misguided (without good evidence).
10. 10 points for pointing out that one has gone to school, as if this were evidence of sanity.
11. 20 points for suggesting that you deserve a Nobel prize.
12. 20 points for each favourable comparison of oneself to Newton or claim that classical mechanics is fundamentally misguided (without evidence).
13. 20 points for every use of science fiction works or myths as if they were fact.
14. 20 points for defending yourself by bringing up (real or imagined) ridicule accorded to ones past theories.
15. 30 points for each favourable comparison of oneself to Galileo, claims that the Inquisition is hard at work on one's case, etc.
16. 30 points for claiming that when one's theory is finally appreciated, present-day science will be seen as the sham it truly is.
17. 30 points for claiming that the "scientific establishment" is engaged in a "conspiracy" to prevent one's work from gaining its well-deserved fame, or suchlike.
18. 40 points for claiming one has a revolutionary theory but giving no concrete testable predictions.

John Baez
Department of Mathematics
University of California
Riverside, CA 92521
email baez@guitar.ucr.edu

BOOK REVIEW

EXPLORING THE NIGHT SKY WITH BINOCULARS, Third Edition, Patrick Moore. Cambridge University Press, ISBN 0521 55538 8 (paperback) £10.95; 0 521 55492 6 (hardback) £19.95

This is a simple practical book, in Patrick's forthright style. I wish I had read the first edition back in 1986.

Setting himself quite a task, Patrick shows the reader both the night sky and the techniques of using binoculars. In the process, he gives much good advice and I hope that lots of people will find the £11 for the paperback version has saved them a substantial amount on the cost of an unsuitable first telescope. As Patrick comments "by now a really good, cheap second hand telescope is about as common as a great auk".

There is a tendency to dip into too many areas: for instance, I did not really see the relevance of an outline of star formation This is a small criticism and mostly outweighed by the authentic tone - the reader can hear Patrick booming away at a rate of knots and throwing off asides in all directions. It makes the book a very immediate, personal guide. It is a You-can-do-it book: for example he suggests 'every binocular observer' should keep an eye on the puzzlingly unclassifiable variable star, Rho Cassiopeiae, just in case. He points out the opportunities that comets offer and prints his own graph of the failing light of nova HR Delphini from 1967 to 1974.

The core of the book is a set of brief guides to binocular subjects in all the constellations and how to enjoy the Moon. This core is surrounded by concise instructions on the techniques of observing planets, variable stars, nebulae, comets and so on. The sections are short so it is easy to dip in and find what you want to know.

This book could be useful to a teacher wanting to have a sound introductory guide to the night sky and relatively cheap portable equipment all in one. Since astronomy is on the National Curriculum, this is an ideal addition to the school library. Much of the book is useful to the unaided eye observer. Any novice would find it most helpful.

Above all it is sheer enthusiasm that remains in my mind. After more than 50 years of observing, Patrick can still write of Sirius "Binoculars show it in the guise of a glittering diamond, with x20 it is almost dazzling."

Major features which may be seen with good binoculars.

Illustration from "Exploring the Night Sky with Binoculars".

STARGAZER'S PARTY

On 22 March an Astroworks team met on Trig Hill, Waiheke Island to introduce local people to the night sky. The programme was one of the Auckland City "People in Parks" activities sponsored by the Auckland City Council for the public's entertainment. In the late afternoon, gumboots, raincoats and other wet weather gear was necessary, but as the sun set so the clouds cleared.

The public were introduced to "Pipehenge" and how it could be used to find the path of the sun, moon and the planets (Plane of the Ecliptic) and the Southern Cross. People who had never bothered about the night sky were enthralled at a look at the crescent moon and a view of Venus through the many telescopes set up. As it got darker, familiar constellations were pointed out and deep sky objects viewed.

The sky was black, in spite of being close to a major city - one of the many advantages of living on an Island - and the viewing was excellent. Then came the time that everyone was waiting for, a look at Comet Hyakutake. For many it was the first look at a Comet, and they were not disappointed as a tail approaching 30 degrees was seen.

No-one was in a hurry to go but when the sky clouded over many people decided to leave. The success of an event like this is difficult to measure but the ongoing comments from people indicated a that they would look at the sky with a different perspective in the future. This is the first of what is hoped will be an annual event held at other Auckland City Parks.

Gloria Witheford and Eric Jackson.

[Ed Note: Eric has featured in previous issues with his 'Pipehenge' invention which enables the basics of the celestial sphere to be taught in an interactive and fun way.]

SPACE SCIENCE LECTURES

One of the recipients of the first round of Public Understanding of Science Awards from the Particle Physics and Astronomy Research Council is an organisation called ESSTeL (Educational Space Science and Technology Lectures). ESSTeL deliver lectures on space science to large (120+) school audiences around the country, completely free of charge.

ESSTeL was established in 1995 by two graduates of the International Space University, currently undertaking PhD's at University College London, and the University of Kent at Canterbury. The two founders were originally invited to give a lecture about space science and the role that Britain plays as part of the "Coventry 2000 Initiative" - a project to encourage inner city children in Coventry to opt for science and maths based subjects. The lecture was so successful, the speakers were invited back the following year, and this led to the formation of ESSTeL.

ESSTeL aims to use "Space" to motivate children across the ability range to maths/science/technology studies by demonstrating the usefulness and relevance of space to our everyday lives. Space science is brought "down to Earth" by using examples that the children can relate to such as Sky TV, telephone communications, shuttle rendezvous manoeuvres and, of course, astronomy amongst others. The 45 minute lectures are aimed not only at those who will go to University or seek careers in space science, but to all students, regardless of ability.

Speakers are all young space professionals in industry or academia and have a broad knowledge of all aspects of space science, and are willing to take (in addition to the lecture) discussion sessions, career talks and general question and answer sessions.

Every school is given a full manuscript of the lecture, and other useful information for future reference. If you would like more information on ESSTeL, or are interested in a lecture being held at your school, please write to Mrs. Sue Bayford, The Space Education Trust, c/o The Royal Aeronautical Society, 4 Hamilton Place, London W1V 0BQ, Tel: 01795 521784.

MOBILE NEWS

Many educators have heard of Starlab, the portable planetarium, but I suspect that many teachers may not be aware of its existence.

Starlab (and other similar systems) are portable star projectors which 'do their stuff' inside a large inflatable dome that is held up by air, much like a bouncy castle. About 30 children can be accommodated inside the dome where the splendours of the heavens can then be revealed.

The whole system can be set up in a large school hall in a matter of fifteen minutes or so and taken down in around the same time. Depending on the amount of extras that an individual operator has, a Starlab system will fit into the back of a car, so they are very portable indeed.

The number of such portable planetaria in the UK has increased over the last few years and there are probably now very few areas which are not directly covered, and most operators are prepared to travel quite a distance to schools.

Most mobile operators belong to the British Association of Planetaria, an informal group of people who are interested in astronomy education by using planetaria. Many operators are also ex-teachers or amateur astronomers, and pride themselves on their presentations for schools.

As a result of a mailing to the known mobiles, I have received details from many different operators. There is not space to go into them all in this issue, but I hope to focus on a couple each time. If you are a mobile operator and you have not yet sent me some information and anecdotes, can I encourage you please!

For reference, I list here the addresses of all the mobiles that I have been able to locate. If there are any inaccuracies here then please let me know and I will correct this listing. I hope you find it useful.

Murray Barber
Skylab Portable Planetarium
14 Cedar Close,
Ditton,
Aylesford
Kent. ME20 6EN

Dennis Ashton
Sheffield Starlab Planetarium
64 Muskoka Drive,
Bents Green,
Sheffield. S11 7RJ

Peter Bassett
The Astronomy Roadshow
167 Shakespeare Road,
Gillingham,
Kent.ME7 5QB

Peter Golding
Astrodome Mobile Planetarium
39 Alexandra Avenue
Gillingham
Kent. ME7 2LP

Ray Worthy
Hartlepool Mobile Planetarium
15 Queensberry Avenue
Hartlepool
Cleveland. TS26 9HW

Royston Dean
Essex Starlab Planetarium
66 Main Road
Hawkwell
Essex. SS5 4JH

Brian and Cheryl Williams
Powys Planetarium
Lanshay Lane
Knighton
Powys. LD7 1LW

Suzy Humphries
Starlab Planetarium
Interaction
HMS President 1918
Victoria Embankment
London. EC4Y 0HJ

Frank Gear
Northampton Planetarium
251 Abingdon Avenue
Northampton NN3 2BU

Gordon Kenny
Northants Starlab Planetarium
2 Daimler Close
Rectory Farm
Northants. NN3 5JT

Richard Knox
Penzance Peripatetic Planetarium
Cornwall Schools
3 Alexander Terrace
Penzance
Cornwall TR18 4NX

Mike Shearer
Plymouth Starlab Planetarium
21 Broad Park Road
Peverell
Plymouth PL3 4PX

Mark Underwood
Universe Express
14 Wygate Meadows
Spalding
Peterborough PE11 1XZ

Dyfed Spacewatch
Griffith-Jones Centre
St Clears
Dyfed SA33 4BT

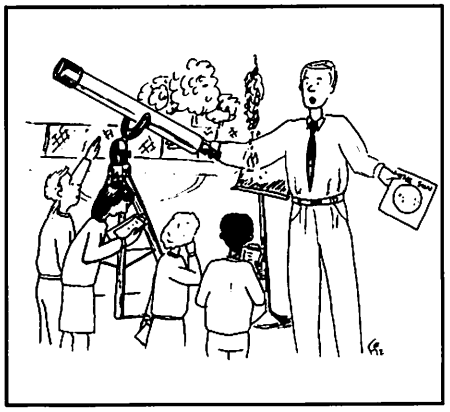
Techniquest
72 Bute Street
Pier Head
Cardiff. CF1 6AA

John Mitchell
33 The Common
Adlington
Chorley
Lancs

Martin Lunn
Honorary Curator of Astronomy
Yorkshire Museum
York

John Napper
'Starfields'
3 Blueberry Rd
East Hagbourne
Didcot
Oxon

Sam Lyttle
18 Helens Drive
The Willows
Craigavon
Co.Armagh BT67 0HE



CURRICULUM CORNER

Where is the Moon?

by Harry Ford, Caird Planetarium, National Maritime Museum, Greenwich

It might seem a simple thing to the experienced observer, but school projects involving the logging of the phases of the Moon by drawing the shape they see in the sky, are fraught with problems. Many students find this exercise impossible if they start at the wrong time of the LUNATION (or Moons' cycle).

Naturally, small children start by looking for the Moon in the early evening, a safe time for them, yet the Moon will only be visible in the early evening for at most, a couple of weeks of its cycle.

At the Caird planetarium, we regularly get calls from teachers asking, 'Where is the Moon? We watched for two whole weeks!'

In fact after Full Moon, the Moon is then visible in the early morning sky, so if you want your students to see the moon, make them start as soon as possible after New Moon. You should find the phases listed in your diary or in most newspapers (usually with the weather section) and some even list the times of moonrise and moonset.

It is worth then taking a look at when and where you should expect to see the Moon.

New Moon is when all we can 'see' of the Moon is the side that is turned away from the Sun. It is thus dark! The Moon is then rising and setting very close to the sun and is not visible.

The next two nights should see the Moon visible as a very thin crescent (a backwards 'C') very low in the south-western sky. Over the following nights as it draws away from the Sun, we get to see more and more of the lit side and the Moon appears to 'Wax' i.e grow. Now is the time to plant seeds if you are a farmer and believe in such old wives tales!

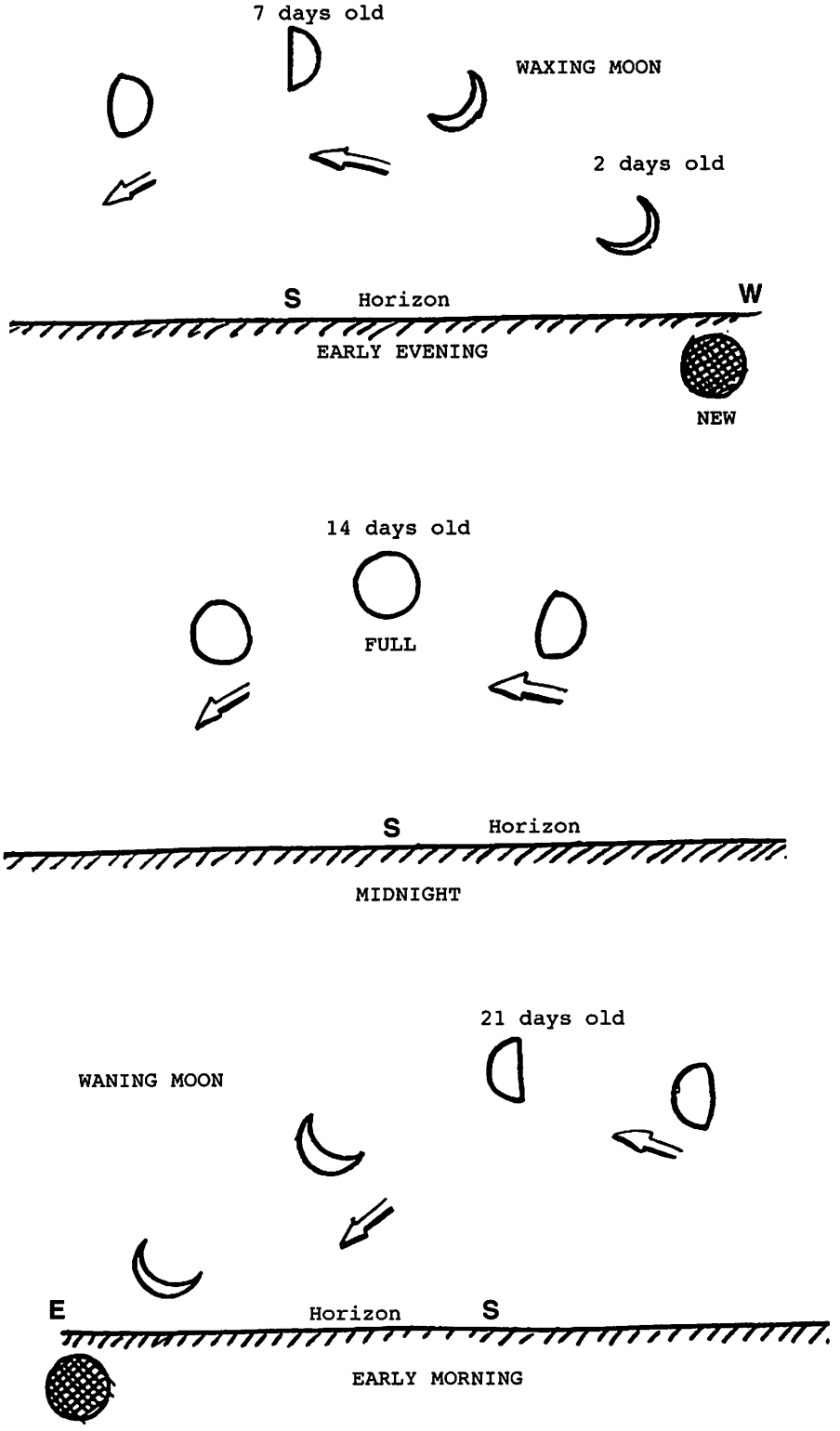
At First Quarter (sometimes called Half Moon) the Moon is '7 days old' and is now 90° away from the Sun in the sky. That means that it rises 6 hours after the sun and sets 6 hours after the Sun. It will be visible then until about Midnight.

Full Moon finds the Moon now 180° away from the Sun, so it essentially rises just as the Sun sets and is visible all night.

After this, the Moon rises later and later, so to observe it you need to get up early in the morning, and you will also notice it 'Waning' as we begin to see less and less of the lit side again.

From the Last Quarter, both the Moon and Sun may be seen in the sky at the same time with the Moon up for most of the daytime. This can amaze the uninitiated who can become convinced that something terrible has happened. After all, the Sun is for the daytime and the Moon is for night-time!

I hope the drawings will help you work out where and when to look. Once it is realised how the Moon travels then it can be easily found and its fascinating phases followed.



The appearance of the Moon at different times

THE NIGHT SKY

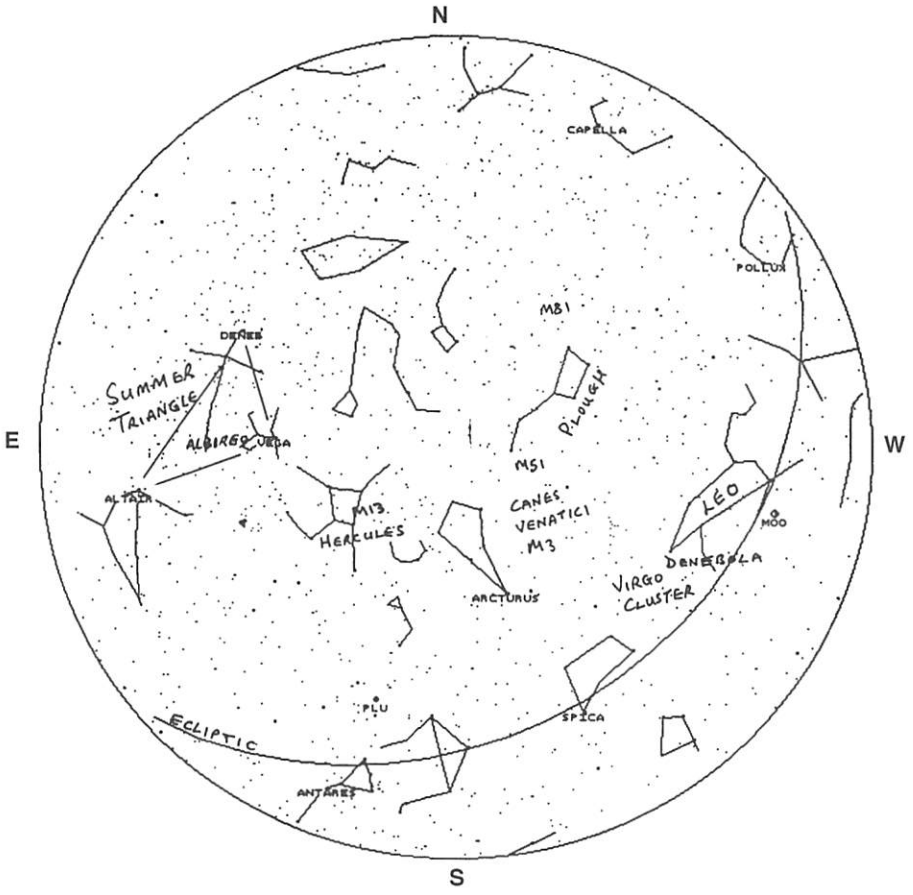
Roger O'Brien

The first thing you will notice about the short summer nights is the absence of naked eye planets, except for Jupiter. Pluto, for those with suitable equipment, will be skirting the northern marches of Libra. This illustrates the orbit of that distant planet, which is usually well away from the ecliptic and outside the broad band of the Zodiac. It is a pity that the Zodiac in summer is aligned along the southern horizon since the brilliant constellations, Scorpio and Sagittarius, are not well placed.

Over in the East, the Summer Triangle is rising. The bright stars, Vega, Deneb and Altair mark its corners. Deneb's own constellation, Cygnus, fills most of the triangle. Albireo, at the far end of the cruciform shape of Cygnus from Deneb, is a must for anyone with binoculars or a telescope. It is a double star and the two components are a golden yellow primary and sapphire blue secondary - very pretty and a fine example of how two stars in a binary system may have different masses and have reached different stages in their evolution.

This is a good time for those with telescopes. The Plough is high up so the galaxies M81, M82 will be relatively easy and M81, a fine spiral, is visible with binoculars. Nearby, in Canes Venatici, is M51, the 'whirlpool' galaxy and the first spiral galaxy to be identified as such. If you get bitten by the galaxy bug, move Southwest wards of the line to the tail, marked by Denebola, of Leo and you will find galaxies drifting in and out of your field of view. There are loads of them. This is a genuine cluster of galaxies (the Virgo cluster) and centres on the massive and huge elliptical galaxy, M87. You may remember some very exciting Hubble Space Telescope pictures of M87. The cluster spreads over the borders into Leo and Coma Berenices.

On a slightly less grandiose scale, try looking for the globular clusters M3 in Canes Venatici and M13 in Hercules. Globular Clusters contain around a million stars in a spherical formation. They are believed to be very old: older in fact than some current estimates of the age of the entire universe, which is a pretty puzzle for cosmologists to solve.



Sky Diary Summer 1996

Information supplied by Eva Hans

The Summer Solstice is on June 21st at 02^{h} 24^{m} GMT. The Autumnal Equinox occurs on September 22nd at 18^{h} 00^{m} GMT.

The Planets this summer, as mentioned by Roger O'Brien are scarce as they are mostly in the morning sky. **MERCURY** is a morning object until July 4th. Then this tricky to see planet will be too close to the **SUN** to see. It reappears after July 19th. **VENUS** is also in the morning sky having finished a magnificent appearance all Winter in the evening sky.

For those of you who rise early, you can see **VENUS** and **MERCURY** together in the morning sky on June 23rd. **VENUS** also meets up with **MARS,** first on June 30th and secondly on September 4th.

For it to meet with **VENUS,** the **MARS** also has to be around in the morning sky. It can be found moving slowly among the stars of Taurus and into Gemini .

JUPITER is a morning object until July 4th when it is at opposition. It is then visible all night. It is quite low down in the south though, among the stars of Sagittarius.

Like the other planets, **SATURN** is a morning object. With the short summer nights this generally means that it is not visible for by the time it rises, the dawn sky is already brightening making observation difficult.

VENUS gets occulted by the **MOON** on July 12th. However, it takes place at nine o'clock in the morning so you will only be able to see it if you own a radio telescope or are fortunate enough to be able to follow both **VENUS** and the **MOON** from before Sunrise with binoculars so that you can still find them in a clear daytime sky.

Summer brings us the best meteor shower of the year in the Perseids. Theoretically it occurs between the dates of July 25th and August 15th when your chances of seeing a meteor are very good indeed. However, it reaches maximum on the night of August 12/13th and this year, unlike previous years, there will be very little moonlight to interfere and wash out the fainter meteors. The shower will be better viewed after midnight and may well be worth staying up for.

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