



GNOMON

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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".

EDITORIAL COMMENT

The Comet is Coming!!!

Yes, we all heard it with Halley in 1986, and it was a bit of let down for all the public and students that had eagerly awaited it. Well, we can't promise anything because that is the nature of astronomy, but it looks certain that a bright, naked eye comet will be gracing our skies by the time the Equinox issue arrives on your doormat, so to prepare you we have a few interesting ideas on comets in the classroom, a finder chart for you to copy and a COMPETITION!!

Also in this issue, a variety of reports on good things going on around the country, and some more ideas to help you with astronomy teaching.

As always, I would love to hear of any activities that you think other GNOMON readers would be interested in, from classroom ideas to observing sessions. Filling these pages can be quite a challenge, especially straight after the start of term when everyone is very busy.

A REMINDER . . .

Have you sent in your 1997 subscription yet? If not this will be your **LAST** issue of GNOMON. Can you afford to miss all the latest news on what is going on in the world of astronomy education? Can you afford not to be in touch? Find that insert from the last issue, or, if it fell out and has got lost somewhere,

send your cheque for the appropriate amount (see box on front page) and enclose your address label from this issue, to the:

AAE, c/o Royal Astronomical Society, Burlington House, Piccadilly, London W1V 0NL.

Mark your envelope for the attention of the Treasurer.

GOOD NEWS!

The revised Primary Astronomy Teachers Pack should be available early in the New Year (hopefully at the ASE conference). Many thousands of the first edition are now in use all over the country, but we can promise that the new issue contains even more classroom activities and photocopiable worksheets, and a

revised and updated resources listing. Also on the cards is an updated Flat Pack. This resource, which currently contains worksheets, posters and other items is down to the last few, so we are taking the opportunity to revise the contents and bring it up to date. More news in the next edition.

MEMBERSHIP of the AAE costs £10.00 a year for individual members, £20 for corporate membership and £7 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£10.00
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(e.g. schools, colleges, etc.)£20.00

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

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* 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 ...

The AAE will be running its **A level astronomy module workshop** again this year at the ASE conference on Saturday 4th January. Places are going fast as this is a pre-booked event.

Stories and Starlight returns to the Old Royal Observatory in Greenwich for a run of January 2-5th 1997. Storyteller Mary Medicott weaves her unique blend of magic and myth in a programme about folklore and sky legends from around the world. Highly recommended! For more information call the info line on 0181 858 4422 or 0181 312 6565.

The **AAE's annual business meeting** will be held in Cambridge for 1997 on June 14th. Mark this date in your diaries now as we expect to have a great programme of events lined up. Don't forget that this meeting is your chance to tell council what you want from the AAE.

The Particle Physics and Astronomy Research Council have funded the production of a **resources guide for teachers of astronomy and particle physics** at all levels. While it cannot claim to be comprehensive, the guide does include the information of where to get a very large number of worthwhile catalogues from. Copies of the catalogue are expected to be available soon. Watch this space!

AAE ANSWER LINE!

Ever had a question about astronomy that you just can't answer? Need to settle the argument over how many moons Saturn has? Want to know when the next major eclipse is?

All of your astronomy education and factual questions can now be put to the AAE via our email answer line. To ask anything, just send us an email to the address below and we'll do our best to get back to you as soon as possible. Thanks to UCL/ULO for hosting us.

The AAEs answer line is at:

query@ulo.ucl.ac.uk

SOMETHING A LITTLE DIFFERENT ...

ASTRA ALBA AND THE 6(+1) QUARKS

A 'Science' play for children based on Snow White and the Seven Dwarfs:

Astra Alba and the 6(+1) Quarks is a play for children to perform. It has been written to stimulate and develop their interest in Science. In the play, a schoolgirl who complains that her stories never have a scientific basis, is visited by 'General Relativity'. He explains that he is in charge of the Universe but sometimes gets awfully lonely just directing his forces, so occasionally visits Earth for a bit of companionship. In their conversation, he mentions various Scientists and scientific events. For example he comments "Oh, I have a few specials who deal with insignificant matters like throwing down apples until someone realises that its a bit odd that they always hit the ground!"

Eventually the General asks Sarah to go into the future with him, to see how fairy tales are made. The story that they watch together is a scientific adaptation of Snow White. The wicked step-mother becomes 'The Wicked Queen of Antimatte'r who rules the 'Kingdom of Darkness'. Astra Alba is her beautiful step-daughter. They hope to marry Prince Comet, who is to visit them in orbit, but his messengers, the pulsars, say that he must marry the most beautiful woman in the Universe. Instead of the mirror on the wall, the Dark Queen consults The Musicians of the Spheres to who is the fairest. They reply:

Dark Queen, our music sings through Space

Praising thy beauteous form and face.

Yet even that cannot compare

With Astra Alba . . . the most fair.

This angers her so much that she orders her servant, the little Robot, to exterminate Astra. Of course he cannot, but takes her instead to the bright 'Kingdom of the Quarks (the dwarfs)'. The Quarks are dressed in the colours by which they are normally represented and are named appropriately Top, Bottom, Up, Down, Strange and Charm. Their job is not mining but polishing stars. It wasn't too bad at first because we hadn't far to travel, but now that they are so far away, we are tired before

we even begin our work - and as the Universe continues to expand we shall not be able to keep all of them bright. They are also sad because they are 'Joined by Gluons' and long to be free. They also fear the Red Giant. However, when he appears, Astra Alba speaks kindly to him and the giant is transformed into a White Dwarf and joins the Quarks in Astra's family. The Dark Queen does not tempt Astra with a poisoned apple, but, in disguise, she begs Astra's help to guard Ganymede, one of Jupiter's moons, which has fallen, 'Just over the lip of that black crater yonder'. The crater turns out to be a Black Hole! Astra Alba is pulled into it and the Dark Queen is now declared the most fair. The Quarks are devastated, 'Nothing ever returns from the Black Hole - No power is great enough'. However, all of Astra's friends form a chain and manage to get her out - though Prince Comet's bright trailing hair is left in the hole. When the Dark Queen tries to rescue it, the Little Robot pushed her in and, because of his bravery, the spell on him is lifted and he is revealed as the 7th Quark. The Quarks are freed to be individuals and, as in all good fairy tales, everyone lives happily ever after. In the epilogue, Sarah and General Relativity discuss the events and then he takes her home. She thinks the adventure was 'a wonderful dream' until she sees that her puppy has become an old dog. The play ends when her mother, now with grey hair, hobbles in and Sarah cries, 'And whatever happened to you Mummy?' The play was first performed at the end of a school year as the culmination of a great deal of exploration - much of it inspired by the children themselves. Science, history, art and music were all combined to make the play a success. The production fired the children's imaginations. They wanted to discover how the Universe worked and aspired to become the next generation of scientists - perhaps the new explorers of Time and Space.

Written by: Mrs Sibly E Morton

Copies of the full script may be obtained free of charge by sending a stamped, self-addressed, A4 envelope to: Communications Section, PPARC, Polaris House, North Star Avenue, Swindon, Wiltshire, SN2 1SZ

THE AAE COMET CONTEST IS COMING

By Mike Dworetzky, University College London

You will soon be hearing a great deal in the news media about a new, bright comet which will grace our Northern skies in the Spring of 1997. It could turn out to be one of the brightest evening-sky comets of this century. AAE and GNOMON are sponsoring a contest which both pupils and teachers can enter,

to increase awareness of this forthcoming spectacular in our skies.

Details are given at the end of this article. Comet Hale-Bopp was independently discovered 22 July 1995 by two amateur astronomers living under the clear skies of New Mexico and

Arizona. Its path and brightness have now been measured and predicted with considerable accuracy and it can be predicted with confidence that it will be a celestial spectacular which will rival and probably surpass Comet Hyakutake, a much smaller object which passed relatively close to the Earth in March 1996 and which outshone all but the brightest stars in the sky for several nights. Comet Hale-Bopp should be at least as bright, but will be a spectacular sight for several weeks.

The difference is that Comet Hale-Bopp will be nearly 200 million kilometres from Earth at its closest approach around the Spring Equinox in March 1997, while Hyakutake 92's closest approach was 20 million kilometres. Hale-Bopp is, therefore, intrinsically about 100 times more luminous than our recent celestial visitor! Presumably, it is either a far more active object, giving off more gas and dust as it approaches the Sun, or it is a much larger chunk of primordial material left over from the formation of the Solar System, or both. Its nucleus is probably 100 to 150 kilometres in diameter, much larger than that of Comet Halley.

Watch for the new comet in the Eastern sky before dawn in February and early March 1997 as it moves slowly through the constellations of Aquila, Vulpecula and Cygnus. For a few nights it will be harder to see, but it will reappear low in the evening sky in late March, when it will begin a slow climb northwards and upwards in the north-western sky over the following two weeks. At its brightest, it may rival or exceed the brightest stars you can see! Unfortunately, for a few nights a nearly full Moon (23rd March) will interfere with observing, but after the 25th the comet should be observable through mid-April, extremely convenient for observing projects for pupils and teachers which might be planned over the Easter break.

Entry in the Comet Contest requires the composition of a poem about the comet in a specific form. During the spectacular fly-by of Comet Hyakutake, several contributors to the Internet newsgroup sci.astro felt inspired to compose short poems in the Japanese form known as haiku, to celebrate the wonder and awe they felt at seeing this exquisite visitor from the depths of space. Basically, a haiku must describe something or express a thought, feeling or emotion in 17 syllables. It does not have to rhyme. It can often be humorous.

The categories are (1) primary school pupils; (2) secondary

school students; (3) teachers of any of the above. The winners in categories (1) and (2) will each receive a prize of a £20 book token, with second prizes of £10 book tokens. The winning teacher in category (3) will receive a copy of the 1998 Astrocalendar of the Federation of Astronomical Societies, and second prize will be a copy of Comet by Carl Sagan and Ann Druyan. The first and second place comet haiku in each category will be published in GNOMON. We may also publish other entries in the category 'Honourable mention'.

Here are two examples inspired by Comet Hyakutake to get you thinking about your entry.

From Carolyn Strong of Portland, Oregon, a sense of wonder:

*From beyond Pluto
a visitor flies by.
I stand humbled in awe.*

But John McIntyre of Seattle, Washington, looked up a bit too long as the comet passed directly overhead:

*Comet in the sky.
Looking upward, I wonder -
now, chiropractic.*

The final deadline for receipt of entries will be April 15, 1997. Winners will be notified during May, and the results will be announced at the Annual Business Meeting of the AAE in June. Winning entries will be published in the Autumn Equinox issue of Gnomon; the AAE reserves the right to publish the results and the winning entries before this date in other media, including news media and the Internet. Teachers should state their profession on their entries.

Contestants should submit their entries (one haiku per individual, please) together with their name, address, school, and status (primary, secondary, or teacher) to:

AAE Comet Contest
c/o Royal Astronomical Society
Burlington House
Piccadilly
LONDON W1V 0NL

COMETS IN THE CLASSROOM

Alex Lovell

The AAE competition links in English with this event. Here are some further suggestions for activities involving the comet. Any questions about these activities should be directed to me at the editorial address.

ART

Make a comet mural, perhaps using cotton wool, tissue paper and crepe paper as well as foil and paint. Or you could create a flickbook showing the comet moving around the Sun. Study pictures of comets on old paintings or in books. There is a famous picture of Halley on the Bayeux tapestry and one is often depicted as the Xmas Star. Can you see why they are known as 'Hairy Stars'? What would a comet look like in the sky over Planet Mars, or from the surface of the Moon? Can you draw that accurately? (Mars has reddish rocks and soil and a pink sky.)

You should include the following information:

When a comet is far from the Sun is a cold, dirty snowball.

When the comet gets close to the Sun, the ices sublime and the dust mixed in with the ice forms a tail.

The tail grows as the comet gets closer to the Sun.

The tail always points away from the Sun.

HISTORY

Create a comet timeline. Take Halley's Comet and work out what was happening in the world each time it was in the sky. Halley takes 76 years to go around the Sun and was last visible in 1986. It has been recorded for a couple of thousand years and was probably visible before then too. What do you

think we will all be doing next time Halley reappears? What will the world be like then?

Now think about Comet Hale-Bopp. Astronomers think that it orbits the Sun once every 20-50,000 years or so. What was happening to the Earth when it was last in the sky? Did humans exist? If so, what evidence do we have? How about further back in time? What was the landscape like for Hale Bopp's visit a couple of times ago? Ice Age? Tropical? This could be combined with an Art project to display your thoughts and findings.

GEOGRAPHY

Comet Shoe-maker Levy 9 hit the giant planet Jupiter in 1995. What evidence is there on Earth for being hit by rocks from space? (Meteor Crater is the most obvious example, but there are others in Australia, Canada and Europe) How would you go about detecting the remains of a crater? What would happen to the rock when it was hit by such great force? What about aerial pictures in helping to identify crater remains. What would you expect to see? (Hint, check out Crater Lake in Canada)

Can anyone find out information on the Chixulub Crater on the Yucatan Peninsula in the Gulf of Mexico? Why is this famous and what creatures suffered as a result of this impact? (Hint, try New Scientist back issues or Astronomy or Sky and Telescope back issues)

LANGUAGES

Comet comes from Greek words meaning Hairy Star. What do other cultures call comets? Which countries use similar sounding words and which are very different. Can you find out why

some countries have different words, and what do they describe? Are there any foreign folklores and myths you can find about comets?

MATHEMATICS

Comets are divided into two types - periodic and non-periodic. Examine the orbit of a periodic comet, it is a long ellipse with the Sun at one Focus. What sort of orbit do comets that don't return, travel in? What do you think the orbit of a 5 year period comet looks like? How about a 100 year or 1000 year periodic comet? What do you think the 20-50,000 year orbit of Hale-Bopp looks like? Can you explain why astronomers can't be any more precise than 20-50,000 years? (hint, think about how much of the orbit we get to see and measure)

SCIENCE

What are comets made of? Why do they sublime instead of melting? Can you think of anything that does that on Earth? If the tail is made of fine dust, why does it seem so bright and so

long? How can fine dust particles seem so solid and bright?

Can you find out anything about the theories of organic stuff being found on comets? Some astronomers believe that viruses come from comets. What sort of evidence would you look for to prove or disprove this?

What would happen to a comet's tail when the comet was in orbit around a close binary star?

Suggested Resources:

'Comet' by Carl Sagan and Anne Druyan. Most libraries have a copy of this major book which covers every aspect of comets including art and literature. ISBN 0 7181 2631 9 (hb) If you can get it, you won't need much else for ideas and information.

Books about Halley's Comet. Most libraries have plenty from 1986.

Comet Hale Bopp Homepage <http://www.halebopp.com/> has plenty of information on Hale Bopp and where to look for it, as well as articles about its discovery.

NATIONAL ASTRONOMY WEEK REPORTS

TECHNIQUEST - CARDIFF

Over 450 family members attended Techniquest's Astronomy Evening, as part of NAW. The well-attended event included:

- Presentations in the planetarium: 'Beyond our Solar System'.
- Starlab presentations entitled 'Greek Myths and Legends'.
- Observations of the night sky, with grateful support from Cardiff Astronomy Society.
- A family quiz.
- Guest appearance of Joseph Le Verrier, looking for you-know-what!
- Encyclopaedia Galactica videos showing in the Science Theatre.

Unfortunately the evening's viewing was limited by the cloud cover, but this did not dampen the buzz of an exciting evening.

The following evening, Techniquest continued the astronomical theme by running a joint ASE/AE INSET for Key Stage 2 teachers.

Both events proved yet again the enormous enthusiasm for Astronomy, regardless of age!

SOUTH TYNESIDE COLLEGE PLANETARIUM

During National Astronomy Week (21st - 28th Sept 1996) South Tyneside College Planetarium set up a giant model of the Solar System. The object of this model is to demonstrate to children just how big and how empty our own little bit of space is. Children usually see illustrations of the Solar System will all the planets crammed together because of the difficulty of representing the real situation.

Our NAW planetarium presentation "The Great Planet Hunt" took visitors on the usual tour through the planets, but also used references to the model to show how relatively small and



Joseph Le Verrier looking for you-know-what!



Planet hunter's HANDBOOK



far apart the components of the Solar System are.

The model is based on the planetarium dome as the Sun. The nine planets were constructed to the correct scale and were placed in schools at the correct distances from the dome. Each participating school has a planet model, and information board giving facts and figures of the solar system and their model, and a map showing where each planet is located.

The model is a permanent installation and we hope that the nine member schools will meet every September at South Tyneside College for a special astronomy day to commemorate its inauguration.

Sometime ago I inspected a really good science department at Queensbury School, Dunstable. A particular strength of the department was the quality of work in astronomy and there was much good display and some very effective teaching using models and the pupils themselves moving around as the Earth or Moon. The head of Science, Mr Paul Revell was good enough to write the account of how they manage astronomy teaching in his school.

Tony Lacey
OFSTED Science inspector

The responsibility for the teaching of astronomy in the National Curriculum has fallen to the Chemistry teachers in recent years. This causes some initial scrambling around for resources and not a little frantic 'reading up the night before' when a level 10 topic came into view!

Nevertheless, they have responded with a range of teaching approaches that have caught the imagination of students. The resources produced by the AAE have been very useful in promoting the use of active teaching and learning styles to convey the subject that initially brought with it the reputation of being very bookwork orientated. The purchase of the Armagh Planetarium CD-ROM* was also influential and we are looking to update our resources in this rapidly growing area.

Our next step is to try and get the model into the Guinness Book of records as the largest scale model of the Solar System in the UK. Does anyone know of a similar model in the UK, and if so, what is the scale? Our Pluto is 34km from the Planetarium.

Please drop a line to
E.M Hans, The Planetarium, South Tyneside College, St George's Avenue, South Shields, Tyne and Wear NE34 6ET

The Planetarium produced some very useful teaching materials to accompany the Great Planet Hunt which include fact sheets and photocopiable worksheets. All materials are under £1 each. For further details, send an SAE to the address above and ask for details of these and numerous other good value teaching materials.

(Ed. There is one in a park in Hampshire and one in the Astropark at Armagh, but I suspect that 34 km will take some beating. Mind you, there is a much larger one in the US which is the site of the Interplanetary Bicycle Ride each year. Now there's a fund-raising thought!)

NATIONAL ASTRONOMY WEEK COMPETITION WINNERS

The photographic competition winners:

In the *Open category*, the theme of which was *The Enjoyment of Amateur Astronomy*, the winner is Pierre Guillermier of Lyon, France, with his photograph of astronomers watching the solar eclipse of 1994 November in Chile. He wins a trip to the COAA in the Algarve. Runner-up was Nik Szymanek of West Horndon, Essex (a member of the Havering Astronomical Society) with a shot of Sunset at La Palma; third was Graham Sinagola of Bowdon, Cheshire (a member of Altrincham and District AS), with Fog at Jodrell Bank; and fourth was Frank White of Chester (a member of Chester AS). All these win rolls of ScotchChrome colour film and book prizes donated by CUP.

In the *Schools competition to shoot the Moon*, the winner of the TAL-1 reflecting telescope was Thomas Godfrey, 13, of Great Yarmouth. Second, and winner of the 10x50 Helios binoculars, was Garry Maddison, 14, of Harrow. Third and fourth, both winning 8x40 Helios binoculars, were Sumandeep Golia, 12, of Derby, and Hannah Bowie, 14, of Kirkby in Ashfield, Notts. All four also get ScotchColor film and CUP books.

Film and books also to: Robert Croker (12), Paul Davison (13), Andrew Maddison (12), Andrew Rattray (11), and Andrew Walters (12).

Well done everyone! Now try our Comet Competition!

SUCCESSFUL LESSONS IN TEACHING ASTRONOMY

The subject has also lent itself to imaginative display work, particularly when this allows pupils to appreciate the size of astronomical bodies and the scale of the distances between them.

We have had an excellent response from students when we asked if they would like to be involved in a project building model solid-fuel rockets. Initial experiments caught the imagination of the whole school as lunchtime launchings became a real crowd-puller! We are now working on a kit that allows us to take and aerial photograph of the school mid-flight.

Perhaps our most successful venture in his field has been our liaison with the Luton Astronomical Society **. Over the last year they have hosted groups of students twenty-strong who desire to observe the night sky through their large telescopes. This observation has proved a valuable complement to the theory work done in the classroom and it has been made relevant to 14 year-old hobbyists, GCSE Earth in Space students as well as sixth form Physicists taking the Cosmology option in their A Level modular course.

Looking wider than the academic agenda, the students get and opportunity to appreciate the extent and intricacy of the created universe and I feel that this is one of the several ways the Science can contribute to the spiritual development of the students. Through listening to the enthusiastic delivery and

instruction given by many of the local astronomical society members, students are given a valuable example of the way that the enthusiastic amateur can make a lifelong contribution to the scientific understanding of themselves and others.

Paul Revell

Head of Science, Queensbury School, Dunstable, Beds.

*The Armagh Planetarium CD ROM has won an award for its contents. Details:

The Earth in the Universe CD ROM. A stunning interactive collection of astronomical images and video clips, including

footage of the Earth from Space, the best from NASA and more. Uses easy animation sequences to demonstrate seasons, phases of the moon, day and night etc. System requirements: 386PC or higher, VGA monitor and video card, CDROM drive, sound card, 64K RAM, DOS 3.0 or higher. Price £54.99. Call Armagh Planetarium for further details on 01861 524725 or fax 01861 526187

** Details of your nearest local astronomical society are available from the Federation of Astronomical Societies.

Please send an SAE giving the address of your school to: FAS, Whitehaven, Lower Moor, Pershore, WORCS. WR10 2NY.

LASSELL DISCOVERS A NEW WORLD

10th October 1996

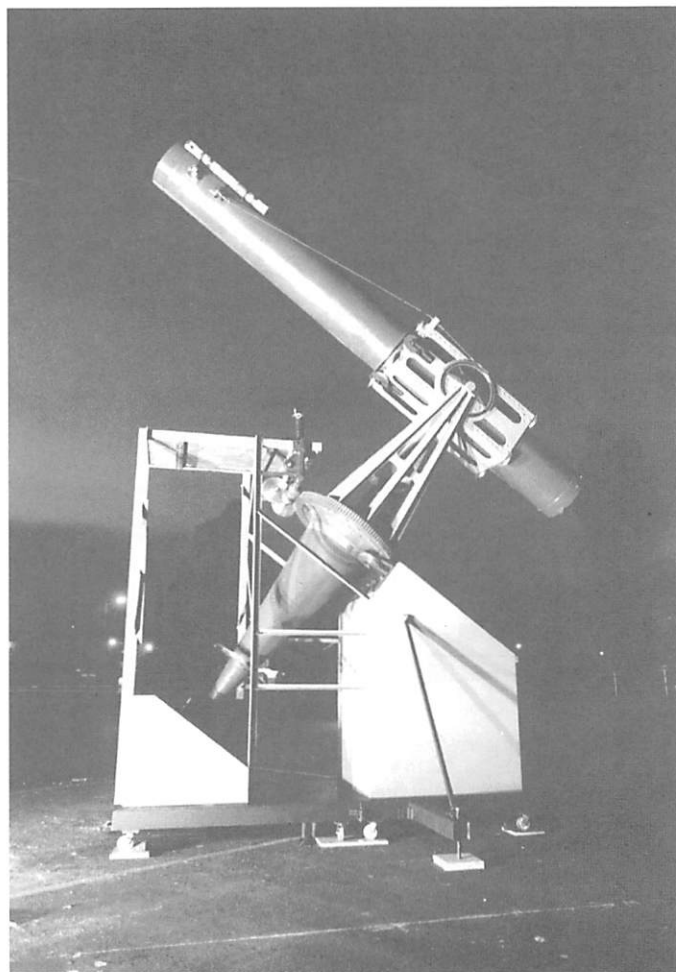
I have just been to a magical evening. Ghosts of long ago joined with modern entrepreneurs to open a time-bridge to the City of Liverpool on the 10th October 1846. William Lassell walked amongst a large audience to enthuse about his discovery, minutes before, of Triton, the largest moon of Neptune. A faithful replica of his great telescope, standing nearly 30 feet high, with its 24 inch speculum mirror stood on the spot where, 150 years ago, he had seen the light from that distant world.

Lassell had read in the Times newspaper of the 30th September 1846 about the discovery of Neptune. The following evening, he directed his recently completed telescope to the reported position and there immediately saw a star showing a visible disc. Had the speculations of the professional astronomers in England about an eighth planet reached him earlier, he would have undoubtedly been the discoverer of Neptune itself.

On the 10th October, Lassell observed again and soon picked out a tiny point of light at the side of Neptune. Being a careful observer he checked during the following nights that the object moved with the planet, eliminating the possibility of it being a distant star that just happened to be in the field of view. In this way he confirmed the existence of Triton, a small cold world, about three-quarters the size of our moon and placed so close to Neptune that it orbits about once every six days.

Now back to the present. Thanks for the evening must go to the National Museums and Galleries on Merseyside who set up the project to reconstruct the Lassell telescope, the Royal and Sun Alliance Insurance Group who generously sponsored the project and our hosts from St. Michael's Primary School. The school now stands on the site of Lassell's house, "Starfield", from where the discovery was made. Finally I must not forget the actor who so splendidly conjured William Lassell from the mists of time.

Alan C Pickwick
President, AAG



CURRICULUM CORNER

All I want for Christmas by Bob Kibble

That time is upon us again. For young astronomers perhaps the two most common questions at this time are:

- i. what was the start of Bethlehem?
- ii. what will I get for Christmas?

There are always plenty of articles to speculate on the first

question but as to the second let me share with you my top ten gifts for a young astronomer (not in any order of priority):

1. Something woolly for those cold nights e.g. scarf, hat, gloves or sports socks. We get our clearest nights in the winter and the cold weather is the young astronomer's main enemy. Prepare for the cold with a woolly present.
2. A star chart or planisphere. To help solve the "I wish I knew what I was looking at" problem a good chart is a must. Some astronomy books include star charts for each season. The larger planispheres are easier to use.
3. A copy of an astronomy magazine such as *Astronomy Now*. You can find this at good newsagents like W. H. Smith. If funds will stretch why not try for a year's subscription. Also available are the more glossy American mags such as "Astronomy" and "Sky and Telescope".
4. A pair of binoculars. Don't spend more than £30. You can get a new pair from a shop like Dixon's for less than £30 and they'll be as good as you need. A pair of 7 x 50 is ideal for all ages. For younger children perhaps try a lighter pair such as 8 x 40. For older teenage astronomers try 10 x 50 but take care as these are often quite heavy.

5. A good astronomy textbook. Choose one with good colour photographs and diagrams blended with some background factual knowledge.
6. An outing to your local planetarium or a trip to one of the big planetaria or astronomy centres e.g. London Planetarium, Liverpool, Jodrell Bank, Greenwich, Armagh . . .
7. Some astronomers software or an astronomy CD Rom. Check first for system compatibility and memory.
8. A secondhand SLR camera, tripod and lockable cable release. With this kit you can take long exposure photos of stars, capture comets and shooting stars as well as snap your own constellations. You can pick up an old Practica or Zenit camera for about £40. A cheap tripod can be found new for £12 and a cable release will cost about £5. Add a roll of 24 exposure colour print film and you have a kit for about £60.
9. A sky globe. You can find hard globes, inflatable globes showing the constellations spread over the celestial sphere. Stamford's map shop in Covent Garden, London, is just one outlet selling these. You can also cut and paste books which produce a sky map or even a Moon.
10. Space posters, T shirts and badges are available at outlets found in the main planetaria.

You will not that my list does not include a telescope. I have deliberately omitted a telescope as it should not be one of your first astro gifts. Instruments on sale in most high street shops or through general shopping catalogues tend not to be good buys. The mechanical parts, tripod and mounting brackets, tend to let them down. Best to wait until you know you are hooked and a member of your local astronomy society. You'll find people there who will either have a secondhand instrument or will be able to advise you on a suitable buy. Solstice greetings.

Bob Kibble

THE VISIBILITY OF THE MOON THROUGHOUT THE YEAR

- Harry Ford, Caird Planetarium, Greenwich

Following on from the problem of finding the moon during a lunation comes the problem with the apparent vanishing of the moon during a large part of the Northern Hemisphere Summer.

There are two things to remember about the motion of the Moon.

Firstly, remember that the Sun is higher in the Summer and lower in the Winter. Therefore, the path that the Sun travels on, the Ecliptic, must be low in our sky in the winter and high in our sky in the summer - during the daytime!

A full moon is opposite the Sun, so in the Summer, when the Sun is at the high point on the Ecliptic, the Full Moon, by definition, will be occupying the place on the Ecliptic on the opposite side of the sky, i.e. the lowest point. This is among the stars of Scorpius and Sagittarius which are notoriously difficult to pick out in our summer skies due to their low elevation and the inevitable horizon glow. Hence, remember that the Moons height in the sky is opposite to the Suns throughout the year, and for summertime, this can mean that the Moon is behind tall buildings or blocked by trees.

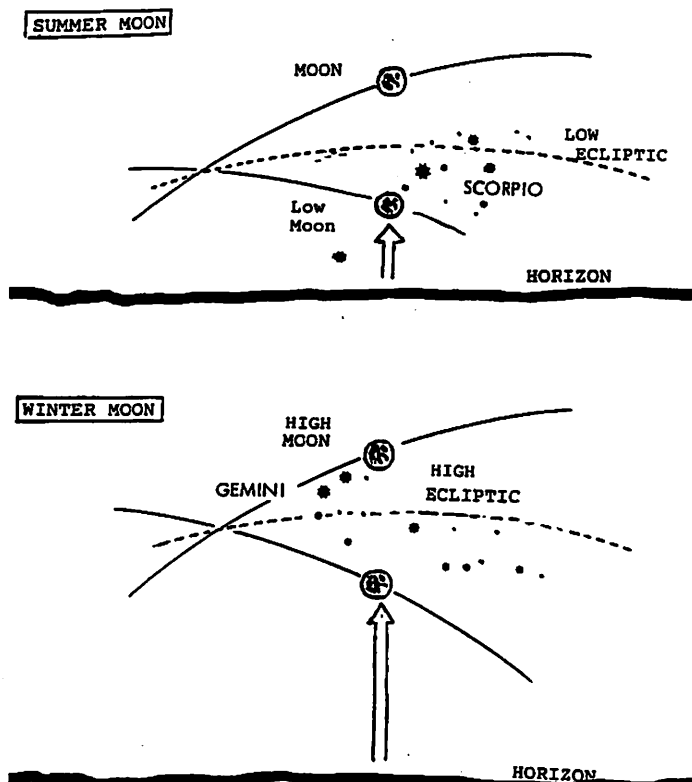
The second complication is that the Moons orbit is inclined at an angle of 5.9 degrees to the Ecliptic and undergoes a very complicated cycle that lasts many years (remember the Moon was said to have given Isaac Newton a headache!). This means that sometimes the point when it is 5.9 degrees below the ecliptic is also the time when the moon is lowest in the sky. For Northern UK latitudes, this means that the moon just about rises, rolls across the horizon and sets again!

All these different altitudes for the Moon throughout the year were noted by the early Neolithic farmers who used the Moon as a calendar.

This phenomena seems to be the reason for the building of Lunar Recumbent stone circles - a common stone circle type in Northern Scotland. The design of these circles means that when the moon is very low in the sky, it seems to be resting on a long altar stone sandwiched between two uprights. Who knows what went on in these circles, when the moon apparently came to lie on these recumbent stones?

Extending this a little further, from the North Pole you get sixth months of light and sixth months of darkness. Hence the Ecliptic must be above the horizon for sixth months of the year and below it for the other sixth months. Remember that the Moon also follows this path, although is inclined slightly to it. You can see that from the pole, you not only lose the Sun for sixth months of the year, you also lose the moon - but at the opposite time. So, when you are in the land of the midnight sun, you have no full moon, and when it is always dark, the full moon is always above the horizon - a midday moon if you like!

Finally. In southern Europe, you sometimes have the Moon at the Zenith (i.e. overhead) something that would seem very odd for us. In Greek mythology the hero Jason (of argonauts fame) marries a lady called Hypsopylae. This is an aspect of the Moon Goddess since 'hypso' means 'high' and 'pylae' is a 'gate' - the 'high gate' of the Moon's arch across the sky.



NET NOTES

A reminder that the AAE Homepage (with links to the EAAE and others) can be found at:

<http://www.star.ucl.ac.uk/~aae/homepage.htm>.

If you haven't already, go and find the Hale-Bopp homepage at :

<http://www.halebopp.com/> for further information about this celestial visitor. This page also has some nice links to other pages about comets including several with pictures.

Most of the amateur astronomy pages in the UK can be found by accessing the UK Index at <http://www.ukindex.co.uk/> is the main page and you can select to do a search of their database which will bring up all the astro pages that they know of. These include a large number of societies, the BAA, SPA, FAS and other worthy bodies. Bookmark your search for future reference.

For information on a wide variety of subjects, go to the Royal Greenwich Observatory's information leaflets at:

<http://www.ast.cam.ac.uk/RGO> These can be downloaded or you can request hard copies to be sent to you.

To keep up to date with the BBC programmes, you might want to link to their homepages at:

<http://bbcnc.org.uk/index.html>.

This issue includes a copy of Universe in the Classroom, but for back issues and other ideas, the Astronomical Society of the Pacific can be found at

<http://www.physics.sfsu.edu/asp/>

This also contains links to the awesome ASP catalogue with its plethora of 'must have' goodies.

Finally, Astronomy On-Line has been and gone, but the efforts of all those schools remain on-line to be read and examined. You can link to Astronomy on Line from the EAAE's pages or go straight to

<http://www.eso.org/astronomyonline/>
Happy Surfing!

TURKEY TEASERS

Sick of the joke in the cracker? Eva Hans from South Tyneside College

Sky Diary Autumn 1996

Information supplied by Eva Hans

Bull, and Gemini the Twins, winter nights are the most sparkling. A line drawn through Orions belt and downwards will hit Sirius, the Dog Star, the brightest star in our night sky. It isn't a huge star, merely one that is only just over 8 light years away, so it seems to be very bright. Compare its brilliant white colour with that of Betelgeuse, the reddish star in the eastern shoulder of Orion. Betelgeuse is a huge, old red giant star that is over 900 light years away. The light we see from that star set out over 900 years ago which is quite a sobering thought.

Under Orion's feet are the faint stars of Lepus, the Hare, and winding down past blue white Rigel, Orion's western foot, are the stars of Eridanus, the River. In the North, the Plough is low in the sky and Auriga, the Charioteer commands the zenith.

Just after Sunset until mid January, you may get a glimpse of **JUPITER** low in the southwest. Jupiter is too close to the Sun for observation after mid January, but reappears in the morning sky from mid February.

SATURN is among the stars of Pisces, below Pegasus, and is visible in the early evening sky as a yellowish starlike object in a region otherwise devoid of bright stars.

As the night progresses, **MARS** is visible as a reddish starlike object below Leo the lion. From mid March it will be visible throughout the night. Mars presents a tiny disk to us, so no details can be easily seen, even through a large telescope.

VENUS remains a brilliant object in the morning sky, rising just before the Sun, until mid February when it gets too close for observation. Venus will appear as an evening star from May onwards.

MERCURY is also visible in the morning sky between January 8th and March 1st. It is very elusive to spot, but is close to Venus in mid January which should help.

Apart from the Quadrantids, a meteor shower that peaks around the night of the 3-4 January where several meteors per hour will be coming from an area of sky now occupied by Bootes in the north, there are no other meteor showers this quarter.

The solstice occurs on December 21st at 14^h 06^m and the Spring Equinox occurs on March 20th at 13^h and 55^m. The Earth is closest to the Sun on January 2nd.

THE MOON

New Moon	First Quarter	Full Moon	Last Quarter
Jan 02 ^d 01 ^h 45 ^m			
Jan 9 ^d 04 ^h 26 ^m	Jan 15 ^d 20 ^h 02 ^m	Jan 23 ^d 15 ^h 11 ^m	Jan 31 ^d 19 ^h 40 ^m
Feb 7 ^d 15 ^h 06 ^m	Feb 14 ^d 08 ^h 57 ^m	Feb 22 ^d 10 ^h 27 ^m	Mar 02 ^d 09 ^h 37 ^m
Mar 9 ^d 01 ^h 15 ^m	Mar 16 ^d 00 ^h 06 ^m	Mar 24 ^d 04 ^h 45 ^m	Mar 31 ^d 19 ^h 38 ^m

There is a partial eclipse of the Moon on March 24th. Most people will notice only a slight darkening and reddening of the full moon as this is not as spectacular as a total lunar eclipse. It will be worth seeing if you can spot anything. The eclipse starts at 01^h 40^m in the morning of the 24th and finishes a 07^h 38^m. The darkest part should occur at 04^h 39^m when part of the moon will be in the darkest part of the Earth's shadow. The next total lunar eclipse is on the 16th September.

Planetarium has provided these cryptic clues for you to try and guess. All the answers are objects, people, places or words in astronomy. *Answers next issue.*

1. avon purse (not a whisper)
2. Untidy list?
3. Einstein greeting Newton?
4. You should get this in a flash!
5. A Ptolemaic mode of transport?
6. Part of the Celestial Circus.
7. Encounter with a Donkey.
8. Fast getaway
9. Engaging spectacle
10. Admiral's plot
11. Optical chant?
12. World-wide marriage bureau?
13. Love Letters?
14. space booze.
15. Diana's leg.