

NEWSLETTER

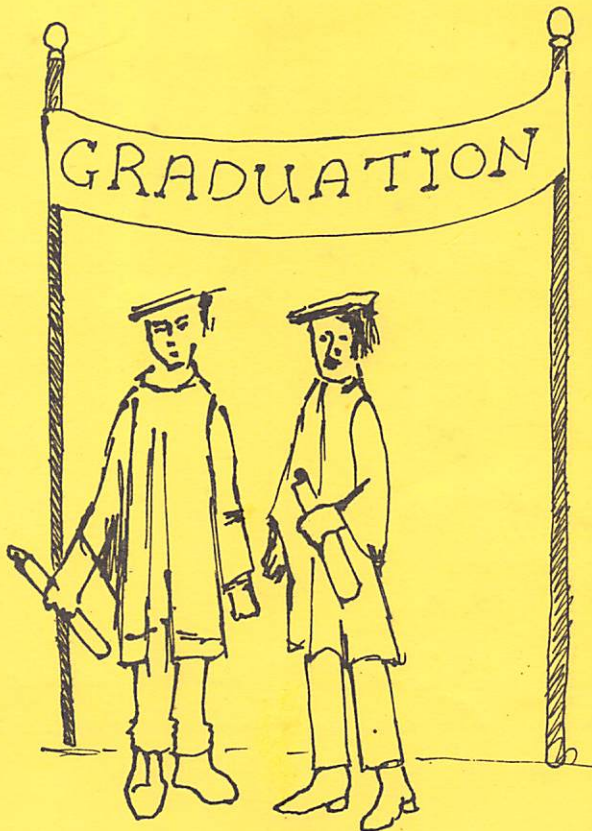
of the

*Association for
Astronomy Education*

Vol. 3, No.2

January, 1984

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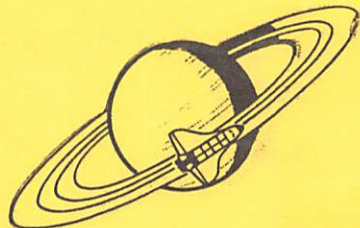
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EDITORIAL

Church Newsletters often carry a page headed "Our Joys and Our Sorrows". That somewhat mawkish phrase might adequately have served as the title for this editorial. There is much in this Newsletter about which we could rejoice. It is saddening to read of the lack of interest in certain other educational circles.

I am delighted, for instance, to enclose with this Newsletter a copy of our newly prepared Handbook. I am sure you will agree that it is a fine production, made possible through the efforts of many Council Members, including Captain Peter Richards-Jones of the London Schools' Planetarium; our President, Mr. D. J. Gold; our Secretary, Dr. P.A.H. Seymour and Mr. Terence Murtaugh of Armagh Planetarium. A thoughtful reading of the text will serve to remind us all of the importance and magnitude of the task we have undertaken.

Also enclosed with your Newsletter is a leaflet giving details concerning the next National Astronomy Week (9th - 16th November, 1985). If you have anything planned or wish to take part, or, even if you merely require information and advice, then please contact the N.A.W. Committee as soon as possible. Letters should be addressed to:- Undine Concanmon, Hon. Secretary, N.A.W., The London Planetarium, Marylebone Road, London, NW1 5LR.

The response to my request for material has been quite encouraging. The leading general article is by our own Secretary and provides further "food for thought". My hope is that it will catalyse a reaction in the Science Departments of our Secondary Schools. Many readers feel that the most important contributions are the ones specifically written to help practising teachers. I am, therefore, pleased to be able to include two very different types of article in our "Teachers' Pages".

Dave Harris has made his second contribution to the series "Introducing Astronomy to Schools"; this time on telescopes. I am, however, disappointed that no-one has yet "taken the bait" and offered material under the heading "Equipment Review". I had hoped to publish a teachers' guide to "Choosing a Telescope" to complement Dave's article . . . perhaps we could have one for the next issue?

Have we any reader willing and able to assess items of astronomical equipment for use in schools?

Our first report on the work of a Local Society is to be found on page 40. It was submitted by Mrs. M. Wrigley of the Reading Society. I found it a "heart-warming" document, rich in ideas, and showing evidence of much dedication and enthusiasm. I have had no offer of any second report. Surely there exist other Local Societies engaged in exciting or unusual activities, the knowledge of which would spur us all to greater effort. Secretaries, please put pen to paper in time for the April issue.

Captain Peter Richards-Jones, as yet, does not have a long list of names of specialists for his "Directory of Expertise", nor have I been besieged with questions to be answered through this Newsletter. These two inter-related projects are obviously late starters. A "Question and Answer" column would benefit a wide spectrum of our readers.

Regular readers may recall that in the issue of January 1983 (Vol. 2, No. 2) we enclosed a questionnaire requesting details concerning items of Computer Software for Astronomy Education. Dr. Paul Marchant is still anxious to receive information on this subject. He has kindly offered to submit an article for the Newsletter on the programmes he has received so far. If you can help please contact him right away at "The Computer Unit, Leeds Polytechnic, Calverley Street, Leeds LS1 3HE", so that his findings may be published in our April magazine.

There is a welcome re-appearance of the "odd" lined drawing, missed by so many in the last copy. These latest ones were drawn for us by Mrs. Joy Stuart of Hastings (Burbage) High School Design Department. They certainly enliven the Newsletter.

Finally, it was with great regret that I learned of the West Midland C.S.E. Board's decision to discontinue the Astronomy and Spaceflight Section from their Physics Mode I syllabus from 1986 onwards. The AAE would be pleased to receive any comments on this, however brief, particularly from those engaged in teaching this syllabus. Please send your comments to me at the address shown on the back cover.

ASSOCIATION NEWS - FROM THE SECRETARY

First of all I would like to congratulate our new editor on the excellent job he made of his first AAE News. He not only maintained the standards set by David Clarke, but added his own personal 'style' to the new format, and he achieved this in spite of many unforeseen difficulties he had to overcome at short notice. Well done Colin!

It was good to see our President back in the chair again at the last Council meeting. He was absent from the previous one because of a short illness, so we were particularly pleased to see him well again.

Our public relations officer, Geraint Day, is doing a good job. I am sure you will have noticed adverts and items on the AAE in a variety of Journals and Magazines. This has led to a large increase in the number of enquiries and requests for application forms. Membership Secretary, Peter Richards-Jones, is doing very well in landing the fish caught in this publicity net.

The Treasurer, Raymond Butt, reports that the financial matters of the AAE are in good order. This is largely as a result of his efforts to get so many of our members to rejoin, and, of course, keeping a careful eye on the coffers of the AAE.

David Harris is busy organising a Teachers' Course, which will be held at Alston Hall (near Preston) from the 23rd-25th November, 1984. More details will be included in future issues of the AAE News.

This year the Annual Meeting of the Association for Science Education (ASE) will be taking place at the University of Exeter from the 3rd-7th January, 1984. Once again I have booked some exhibition space for the AAE. I am assisting with the organisation of a session on "Astronomy in the Middle and Secondary School".

As President of the Devon Astronomical Association, I organised a planetarium competition here in Plymouth in the summer, and teams from some of the member societies took part. Competitors used observing torches to plot the positions of the Moon, planets and a nova, as shown in the planetarium sky, on star maps with which they were provided. They also plotted the paths of a few meteors and the path of an artificial satellite. Additionally they had to

estimate the time of night for a given date. Yet another problem consisted of estimating the date from the aspect of the sky just after sunset. The competition was enthusiastically received by the competitors. Many felt that it tested those skills which were part of the stock-in-trade of an astronomer.

As a result of this competition I suggested to Undine Concannon, Secretary of National Astronomy Week, that several such competitions could be held at planetaria all over the country, and that the final could be held during National Astronomy Week at the London Planetarium. Undine put this suggestion to the NAW Committee and they said they would "give it every support ..." but I have been asked to do the organising. The London Planetarium is also willing to make its facilities available for the final.

If any planetarium directors are willing to organise a local heat in their own area, could they please get in touch with me as soon as possible.

This year we will be having elections to fill any vacancies on Council, but at the moment it is not clear how many vacancies there are likely to be. However, if anyone would like to nominate someone for Council please remember the following points:-

- 1 - The proposer should get the written permission, with signature, of the person nominated.
- 2 - The proposer, seconder and the nominee should all be fully paid up members.
- 3 - There will be a postal ballot to decide the outcome.
- 4 - Please let me have the names (and signatures) of nominee, proposer and seconder by the end of February.

TAX RELIEF ON MEMBERS' SUBSCRIPTIONS

The Inland Revenue has approved the Association for the purposes of Tax Relief on Subscriptions paid wholly out of earned income. The approval is backdated to 6th April, 1982. Members should apply for Relief through their Local Tax Inspector, bearing in mind that the provisions of the relevant Act require subscriptions to be paid from earned income, and that membership of the Association is relevant to their office or employment or the exercising of their profession.

(continued)

It would appear that retired members do not qualify and, of course, affiliated organisations do not qualify for tax relief.

R. Butt,
Hon. Treasurer

* * *

ADVANCE NOTICE

The AAE is organising a residential week-end course for teachers at Alston Hall, near Preston, on 23rd - 25th November, 1984.

The main theme will be "Daytime Astronomy in the Classroom". Obviously a major topic for consideration will be the Sun, but, also included will be talks on the Moon, Planets and environmental and biological topics related to Astronomy.

The course is open to all Primary and Secondary teachers. Small groups will be formed for practical workshop sessions to deal with these topics at their various levels. It is expected that telescopes and computers will be available for informal use under supervision.

If you feel that you already know enough - please come and tell us about it! It promises to be a great week-end, in comfortable country house surroundings. Bar available on premises!

* * *

BRINGING THE COSMOS TO THE CLASSROOM

P. A. H. SEYMOUR

(This is a summary of a talk given by the author to PONLAF on the 28th October, 1983)

Space Science and Astronomy have received fairly extensive treatment over the last ten years in all the publications covered by The Times Index, and the UK continues to make important contributions on all aspects of these subjects. Yet, during this same period, there has been less than one item per year listed in the index (which includes items published in THES and TES) on Astronomy in UK schools. This reflects, to some extent, the sad fact

that astronomy is not yet a part of the curriculum. My own attempts to correct this matter in the educational press have had rather limited success, so I have concluded that editors and sub-editors, perhaps because of gaps in their own education, consider the teaching of astronomy unnecessary and unimportant.

In 1973, to mark the 500th anniversary of the birth of Copernicus, TES published an article by John Ebdon, in which he argued a convincing case for including astronomy in the curriculum; but the number of items to appear since then are few and far between. In 1978 TES carried a report on a survey of students entering colleges of education, to find out how well they were being prepared and educated for life. This survey was based on an earlier one conducted by the Association for Education in Citizenship in 1950. Both surveys showed that 92% of students received no instruction in astronomy.

The reasons given for including astronomy in the questionnaire were that, "A valid contemporary outlook is not possible without a general understanding of the cosmos in which we are living, and there can be few better antidotes to blast materialism,, than an appreciation of the vastness and wonder of the universe as revealed by astronomy."

How did this situation arise? Are there valid contemporary educational reasons for including astronomy in any revision of the secondary science curriculum?

Astronomy teaching started in the 19th century in the major public schools, but soon became part of teaching in elementary schools, various public educational institutions, and teacher training colleges. In a masters thesis presented at the University of London in 1978, J. C. Codling stated that there was a decline in astronomy teaching from 1870 onwards, and he attributed this to the revised code of practice for teacher training. A colleague of mine, doing research into the teaching of science, suggests that other factors were also at work. He suggests that biology, chemistry and physics were being incorporated into the curriculum because they were considered relevant to the needs of medicine, agriculture and industry. Astronomy was omitted because it was not relevant to these needs, and those aspects that were useful (i.e. to

navigation) were taught in nautical schools and colleges. It was, however, still taught in some schools by enthusiastic and dedicated teachers.

The real revival of interest in astronomy occurred with the coming of the space age. The establishment of a number of planetaria in various parts of the country did much to promote interest in the subject among school children and their teachers. In a few areas the establishment of Polytechnic and Public Observatories helped to meet the needs of schools that were interested in teaching the subject. Astronomy was also included in several physics, general and environmental science syllabi that were developed at this time. All these factors influenced primary schools rather than secondary.

In 1979 representatives from the DES and several astronomical societies met to discuss astronomy teaching in schools and these discussions led to the setting up of an ad hoc Working Party on the subject. As a result, partly of the activities of this Working Party, but more directly through the initiative of three planetarium directors and a CFE lecturer, the Association for Astronomy Education was set up.

A great deal of interest has recently been focused on the science curriculum. Much of this followed from publications by the DES, the Association for Science Education and the Royal Society, and the setting up of the Secondary Science Curriculum Review (SSCR). The opportunity now exists to include astronomy in any revised models of the curriculum. A recent issue of TES reported that staff of the SSCR felt that subjects such as "astronomy and geology" ought to be included in the revision of the curriculum.

There are compelling reasons for including astronomy.

Western culture bases its overall view of the structure, evolution and origin of the universe on astronomical observations interpreted in terms of the known laws of physics. This standpoint influences our social and cultural values. Thomas Kuhn, in "The Copernican Revolution" says, "Every civilization and culture of which we have records has had an answer for the question: 'What is the structure of the universe?' But only the Western civilizations which descend from Hellenic Greece have paid much attention to the appearance of the heavens in arriving at that answer."

Our view of the universe has affected our religious belief, our philosophy, our art and our literature.

In his book 'Civilization', the late Lord Clark drew attention to the relationship between cosmology and art: "..... Artists, who have been very little influenced by social systems, have always responded instinctively to latent assumptions about the shape of the universe." The influence of astronomical thought on literature is evident in the works of Chaucer, Donne, Hardy and many other well known poets and writers. The Copernican Revolution and the trial of Galileo illustrate the effect of cosmological theories on religious belief.

Another very important reason for including astronomy in the curriculum is that the external universe affects our terrestrial environment in several ways. It is, of course, well known that radiation from the sun, modulated by the movements of the earth, is responsible for day and night and the seasons. The tides are caused by the combined gravitational pull of the sun and moon on the oceans. The earth is also continually bombarded by sub-atomic particles from the sun, from the Galaxy, and from violent events in distant galaxies. Since an important part of science is concerned with physical factors that affect earth, it is important to include a study of the forces, fields, radiation and particles that link the geophysical environment to the extra-terrestrial environment.

Physics is fundamental to all science and technology but no physics course is complete without some discussion of astronomy. Physical discoveries made in an astronomical context have influenced the history of the subject. Furthermore, the universe provides an extension of our terrestrial laboratories which allows physicists to investigate the behaviour of matter and the laws of physics under conditions that cannot obtain on earth. Astronomy also allows physicists to test the spatial and temporal validity of physical laws. Astronomical problems have acted as a stimulus to mathematical research and discovery, especially in those areas of mathematics that are relevant to theoretical physics. To limit the teaching of physics to terrestrial situations is to reduce the universal grandeur of physical concepts to a parochial set of rules.

Astronomy makes vital contributions to other sciences. Time plays an important part in all science, and here astronomy has made fundamental contributions. The short period cycles of day and night, the seasons and the tides are important to Earth sciences and biology. The age and evolution of the universe and the Solar System provide the setting for any discussion on the origin and evolution of the chemical elements; the formation of Earth; and life in the biosphere. The scope of the terrestrial sciences is being further extended as space probes gather information from the other planets. Studies of these environments are leading to a better understanding of our own planet.

The document published by the Association for Science Education entitled "Alternatives for Science Education", states that one of the aims of a science education should be, "To gain a perspective or way of looking at the world that complements and contrasts with other perspectives and methods of organising knowledge and inquiry, and without which the individual cannot achieve a balanced general education." Such an aim clearly implies a need for astronomical content in a science curriculum.

Astronomy develops students' appreciation of space and time; it deepens their understanding of the character of scientific laws; and it enhances their knowledge of the unity and scope of science. Surely this important aspect of our children's education should not be left to Mr. Spock, ET or the Jedi.

* * *

NEWS FROM THE SOCIETIES

When I was asked to write an article about the READING ASTRONOMICAL SOCIETY for the AAE Newsletter, I hesitated, fearing it could be boring repetition. Articles have appeared in various journals of its birth in 1972 and its progress, the most recent one being in a B.A.A. journal (Vol. 93, No.3).

Similar to many other Societies we have held fund-raising events and exhibitions. With thanks to many not forgotten friends, for their help and support, we have grown to an attendance of over eighty members at every meeting in the current session. As would seem appropriate my theme for this article is based on educating astronomy

to people through a local Society. The title could be: "Gently Does It", as I agree with the comments made by Dave Harris (Vol.3, No.1).

On checking through our records it appears that personal contact has been made to nearly one thousand persons by the Secretary. They all lived within a fifteen mile radius of Reading. In eleven years approximately three and a half thousand programmes have been issued.

Two well constructed easel type boards with various photographs attached, tour the libraries and public places. They are also used with other items for Building Societies' window displays.

Education begins at birth and a playgroup has been encouraged to look at the Moon. I know a four year old who speaks of craters on the Moon and a class of eight year olds who produced illustrated books on star patterns and space rockets. The seed has now been sown to try and produce short and simple slide/tape talks for primary schools and, if required, for any evening or Saturday classes held in the libraries. Members have given many talks to the library groups.

Many junior and senior Guide and Scout group leaders welcome an astronomical syllabus so that their group can obtain the Astronomy Badge. Members of the Society have been adjudicators on several occasions as well as giving talks and using the telescope. Venture Scouts have also had talks as part of their training for the Duke of Edinburgh's Award Scheme. A few years ago we were particularly proud to have helped one person gain his "Gold".

The first President of the Reading Society was the Headmaster of Reading Grammar School. He gave a small telescope to the Space and Astronomy Group (an after school activity) and many members from the group joined our Society. It was through this President that we were introduced to the Headmasters of four private schools. Two schools offered us land for an observatory and the other two offered us the use of an 8" and a 7½" Cooke refractor. Both had not been used for a while due to the retirement of the physics masters who had been interested in astronomy.

Following negotiations we were able to encourage the new physics masters and the pupils to use their excellent

instruments. We helped to repair certain parts and we gave a series of talks to the pupils. We were very lucky to have had such wonderful opportunities and the friendship continues. It would appear that without the worry of fund raising events for an observatory or a telescope of our own we have been able to concentrate all our efforts to the perfection of the Society. We have helped the observer and encouraged the armchair astronomer.

We were also fortunate to receive two six inch reflectors as a result of a project arranged by our present President. Later we obtained another six inch reflector from a legacy. These telescopes are available for members' use together with two pairs of binoculars which can be hired each month.

The student members of the Society are the scholars from the age of six years to twenty years. The very young mingle with the seniors. They are advised if the meeting is too advanced or it is arranged so that they can go home during the coffee break.

At the other end of the scale several members at Universities return for the monthly meeting. We have had one member studying astronomy at Birmingham University and two at present at University College, London. All the students are encouraged to speak once a year at their own meeting. They always contribute a wealth of information as well as receiving training for public speaking in future years. A young lad who joined us in 1978 now gives our monthly "Sky Outlook" and has spoken recently to groups aged eight to eleven years and twelve to sixteen years, organised by the Y.M.C.A. Several students have gained their "O" level in astronomy privately. In this field, I wish the AAE could supply more information to Societies for their members. Recently a teacher offered to give private tuition which will be a great help for future enquiries.

Astronomy education is not confined to schools. In fact one is being educated until the day one dies, therefore the courses run by the Workers Educational Association help the senior age group. It was with pleasure that a team of five people spoke at a ten week course. The success must have been due to the fact that the 'teachers' were not only knowledgeable but very keen, and their enthu-

siasm infected their audience. The sharing of the duties spread the work load for five very busy people, but it was also done so that each person could concentrate on his own special interest, perhaps the Moon, the planets or astro-photography and so on. If only all the teachers in schools could have this same infectious complaint!

One has heard very little about handicapped people in astronomy education. Many of them have their sight and a desire to learn. Perhaps they could be remembered. It was a real joy to see the gentleman, who was using a wheelchair, board our plane at Gatwick Airport for the trip to Java to see the Total Eclipse of the Sun, 1983. To those who cannot travel please show your slides, your telescopes and give them your time. When we speak to the Hard of Hearing Club we use an overhead projector for the 'speaking' part as the members cannot lip read in the dark. We have had many very successful evenings this way. At the telescope a few cards with bold black print can be illuminated by a red light and a few constellations or planets pointed out to them. This help and with books to read opens up their life a little more.

Similarly a disease of increasing years sometimes brings on visual handicap, but the memory remains and needs to be rekindled. Our President, a few years ago, had one or two constellations pricked out in Braille and he used them for a talk. I have given several simple but very descriptive talks about astronomy and in particular the total eclipses of the sun. If a very large screen is used the visually handicapped can often see some parts of the picture. Also, for them a description of one's activities on cassette makes a welcome change from the radio.

A total eclipse of the sun invariably creates interest, as does N.A.S.A.'s Moon rock from the S.E.R.C. Both are quite special but the total eclipse often occurs in a country which has much to offer when giving talks. Java 1983 has been no exception and astronomy education certainly extended to Java. The people had been warned by the Indonesian Government NOT to look at the sun. Those in the cities were told to watch it on the television. Some were told to pray as many still believe that the dragon eats their sun. They were all very intrigued, many were mystified and frightened. They needed a lot of

encouragement to look through our special equipment. Their smiles and look of amazement on their faces were our reward - plus a superb eclipse.

We went to a large store, similar to Woolworths, during the evening before the eclipse. A gentleman approached us and asked about the eclipse. What happens? What is it like? Is it dangerous? Soon the assistants and customers were crowding around, all eager to know more. The nearest thing to me was a yellow 'T' shirt and on the next counter a dark blue one, both in polythene bags. What better to demonstrate the Sun and the Moon in an eclipse? Why worry if my Sun and Moon were oblong and not round? Education of Astronomy with 'T' shirts! Item 1 of Any Other Business on the agenda of your next Committee Meeting!

MURIEL WRIGLEY

* * *

"INTRODUCING ASTRONOMY TO SCHOOLS II"

SOME THOUGHTS ON A SCHOOL TELESCOPE

When Astronomy has begun to establish itself in school, whether through a School Society or by inclusion in the syllabus, the thoughts of staff and children will naturally turn towards a telescope. If the school is unusually fortunate, one may even be found in a locker covered by dust, a relic of a bygone, more enlightened age. It is a constant cause of surprise to me to discover just how many schools do possess a telescope of one sort or another. Such being the case, then a careful clean and adjustment with perhaps a re-aluminising of the mirror, will make it ready for use.

Problems arise if no such telescope exists. I suggest that it would be a mistake to rush into the purchase of a telescope before considering three important questions:-

- 1 - When shall we be able to use it?
- 2 - What are we going to use it for?
- 3 - How much do we intend to spend and, where will the money come from?

Ready cash is not easily available these days, either through requisition or the Head's contingency fund (which he is always very coy about). Parent Teachers' Associations may offer financial aid but one has to beware lest other teachers' projected pet schemes are asked to take priority. Astronomy is a minority subject and parents often know nothing about it; there is therefore no motivation to assist, hence my remark in the previous article about involving parents in the practical activities of a Science Club.

Having, we hope, arranged for ready cash, we must next give serious thought to the type of instrument needed. If the majority of its use is likely to be during the school day because the sun is an obvious target, then a small refractor will be adequate; however, if night time work is envisaged a reflector may be better. Arguments may be advanced for and against each type. These involve consideration of such issues as, ease of storage, portability, maintenance requirements, housing (if large) and whether or not trained pupils will have access, with or without supervision.

A small refractor is always worth serious consideration for solar work. Make sure that you have a projection screen and light guard available for safety reasons. Never leave the pupils unattended. The sun is very dangerous! Even a casual glance of it through the refractor could cause permanent blindness. ALWAYS project the image from the eyepiece on to a piece of white card fixed to a bracket or arm attached to the telescope. A group can then view spots and trace their positions day by day. Structure changes may be observed to take place within the larger spots. Winter afternoons (or even mornings) sometimes provide opportunities to observe the moon or planets. Again, a refractor will be adequate for this, but children should be forewarned that the images of the planets produced by a school telescope will always appear very much smaller than the photographed images to be found in books.

If a reflector is considered then it should be simple in design and portable, unless of course, the construction of a complete observatory is the intention. A six inch Newtonian is a good proposition, particularly if interested

staff, pupils or parents can construct it using bought optical parts. These days this is not such an involved task as might be thought. A Dobsonian mount will serve for most purposes. This may consist of simply two boxes, one serving as the tube and mounted into the other one with trunnions resembling those of a cannon. These can be made of chipboard and given a coat of paint or varnish. The optical parts can be mounted on simple brackets. This design is very stable, not easily being pushed over. This method of mounting is also quite adequate for both lunar and planetary observing, as well as providing a convenient eye position for solar projection. With brighter objects photography should also be possible. Today, most schools (or their pupils) have access to a single lens reflex camera. If not, one can always be borrowed. Modern film gives excellent results.

I have found, through experience, that once a child has had the opportunity to look through a good telescope he will become very enthusiastic. Obviously, many teachers, on the other hand, will be rightly cautious over committing themselves to acquiring a telescope, and possibly even more worried about using it and keeping the optics in working condition. I would urge any teacher in this position to make contact with a local amateur to see if he can either make arrangements for a school group to view his own equipment or, for he himself to make a personal visit to the school with a portable instrument.

Finally, please do not neglect consideration of the purchase of binoculars. Much can be achieved using a fine pair. You may even consider the purchase of these as a best first step. For optimum performance they should be mounted on a stand and care should be taken to train each child to achieve correct eye separation and focus. Using these methods children will certainly learn their way around the sky. The acquisition of a pair of binoculars as part of school science equipment will not create such a drain on the funds as the purchase of a telescope and colleagues, who might strongly object to the telescope, may well admit that a pair of 10 X 50 binoculars is a much sounder and more useful investment, particularly if subsequent arrangements are made for field trips.

* * *

Despite their foreboding appearance
the grindem and chopem rocks are
really quite harmless.



* * *

PLACES TO VISIT

THE HERSCHEL HOUSE AND MUSEUM

The Herschel House and Museum in Bath was opened to the public on the 200th anniversary of William Herschel's discovery of the planet Uranus from there on March 13th, 1781.

The house at 19 New King Street has been renovated by the William Herschel Society with the generous support of the owners Dr. and Mrs. Hilliard. It is by Bath standards a modest Georgian terraced house, built in 1766, the same year that Herschel moved to Bath to become organist at the newly opened Octagon Chapel.

The Herschel Museum occupies three floors; at street level are two rooms; the first illustrates the Herschel

family history and there is a display of booklets on sale. The larger room contains a display of Astronomical Exhibits, a detailed model of the 40 feet telescope, a full size replica of a 7 feet telescope, Herschel artifacts including Speculum mirrors and eyepieces, also thermometers and a prism relating to his discovery of infra-red rays.

On the floor below are kitchen, dining room and Herschel's workshop, where the incident of the exploding flagstones occurred during his unsuccessful attempt to cast a 30 feet Speculum. Here also is Herschel's lathe used for making eyepieces. The workshop gives access to the garden which in Herschel's day would have had a clear view over the River Avon to the South.

On the first floor are the Drawing room and Music room, the former with period furniture and family portraits, the latter with an 18th century square piano, other musical instruments and the remains of the Octagon Chapel Organ.

The Herschel Museum illustrates not only his achievements in astronomy and science, but also his musical career and life in 18th century Bath.

Much of the display material has been provided by the National Maritime Museum.

Bath is one of the leading tourist cities in the country and has innumerable places to visit to suit all tastes.

The Herschel House and Museum is open on Wednesdays and Saturdays, 2.00 to 5.00 p.m. from March to October inclusive.

For the 1983-84 winter season the museum will be open on Sundays only from 2.00 to 5.00 p.m. November to February. Visits at other times and by parties can be arranged by writing to the William Herschel Society, 19 New King Street, Bath.

Membership of the Herschel Society is £2 per annum and donations toward the continuing cost of maintaining this unusual museum are welcome. For full details and to arrange group visits you are invited to write to the Hon. Secretary, The William Herschel Society, 19 New King Street, Bath, BA1 2BL.

Annual Herschel Lecture in Bath

The fourth Annual Herschel Lecture will be given by

the Astronomer Royal, Professor F. Graham Smith, F.R.S., who will speak on "Telescopes Old and New". The lecture will be at 19.30 hours on Friday, 9th March, 1984 in the Pump Room, Bath. Tickets cost £1.50 and may be obtained from the Treasurer, William Herschel Society, 2 Lambridge, Bath, BA1 6BJ

The Herschel House and Museum at 19 New King Street will be open during the afternoon from 14.00 hours for those travelling to Bath early.

Sir William Herschel

WILLIAM HERSCHEL was born 15th November 1738 in Hanover. His father was a gardener and self-taught musician. Herschel, aged 14, joined his father in the Hanoverian Guards as an oboist. He left the army and came to England in 1757 where he obtained musical engagements in London, Leeds and Halifax whilst also composing and studying the theory of music.

He moved to Bath in December 1766 and in 1772 brought his sister, Caroline, twelve years his junior, from Hanover, to join him in Bath. She was his devoted admirer and skilled assistant, but also a very competent singer and astronomer. She discovered eight comets and in 1828 received the gold medal of the Royal Astronomical Society.

William in Bath composed for and played the new organ in the Octagon Chapel. He also played in the Assembly Room Orchestra and frequently performed in Bristol and other towns.

Herschel's study of the theory of music led him to mathematics, natural philosophy and astronomy. He experimented with the construction of telescopes and made many 7, 10 and 20 feet focal length mirrors. He discovered the Planet Uranus on 13th March 1781.

He left Bath in 1782 for Datchet when appointed King's or Personal Astronomer to George III. In 1788 he married and his only son, John, was born in 1792. When living in Slough he built the famous giant 40 feet telescope. His experiments with light led him to discover infra-red rays. He was made President of the newly formed Astronomical Society in 1821 and died at Slough in September, 1822.

* * *

Alfonso (King of Castile and Leon, 1221 - 1284)

(On having the Ptolemaic system of astronomy explained to him).

If the Lord Almighty had consulted me before embarking on creation, I should have recommended something simpler.

* * *

REVIEW

"MAN IN SPACE"

Pictorial Charts Educational Trust - Cat. No. 1713

Four Charts (38x50cm) with notes by Dr. A. Wilson
£3.40 post free

The format of these charts is good, and makes them ideal for wall displays in the classroom. Each chart comprises of several coloured pictures (mostly photographs) with bold easily readable legends, both succinct and explanatory. Photography and printing is of a good quality. This is most important with respect to wall charts and I have had the onerous job of taking these particular publishers to task on another occasion. But not here - on the contrary. Annotations by Anthony Wilson are commendably written in a nice, easy and informative manner. They form a good backing for the teacher and a general reinforcement to the charts, even if reference to the charts themselves is scant.

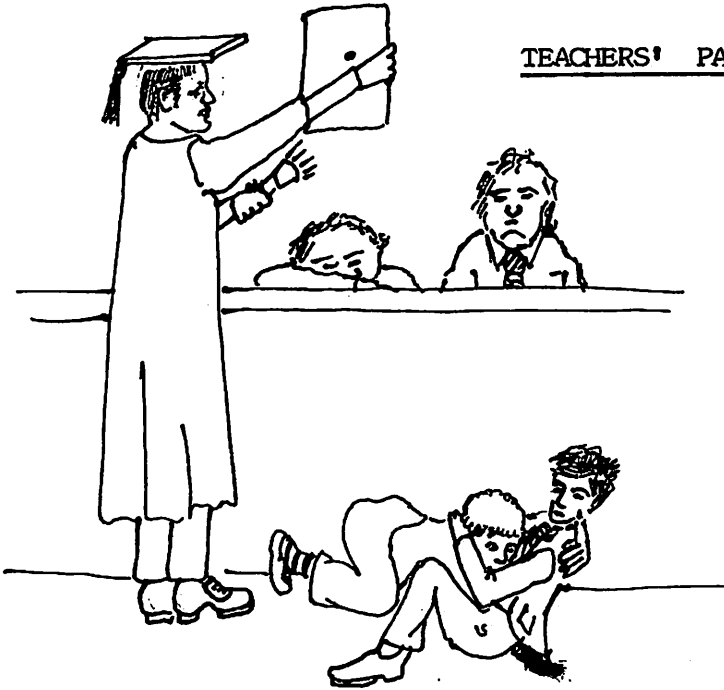
There are of course a few crits. One of the charts for instance depicts a diagram of a space suit, unfortunately not a very comprehensive one, and a good chance has been lost here; similarly, another picture shows an earth-bound control room which is not very inspiring (they do abound in S.F. films) and might have been better replaced by a picture showing the actual size of the Shuttle and its rockets; one diagram does compare other rocket sizes but the Shuttle is not included. How tall does it stand before blast off? A further drawing showing the interior of the Shuttle is in fact far inferior to the accompanying notes. Also I felt that words like 'diffused' and one or two others are a little too sophisticated for younger children.

Now, if in space, weight is a criteria the reader should be told so . . . but 2.5-3 Kg of water? instead of cl or pints, it just compounds the indecisions of this funny age that we live in.

However, please buy - they are good and most worthwhile. Send for them at 27 Kirchen Road, West Ealing, London, W13 0UD.

P.R.J.

* * *



Astronomy and the School Curriculum

There is a widespread misunderstanding of what an experiment is. In school it tends to be thought of as something you do with a piece of apparatus and you either get the right answer (known to the teacher) or you don't.

Now astronomy is an observational science. There are no "right" answers. The answer is the average of the observations. Now, in the last resort this is true of any genuine experiment but it stands out very clearly in astronomy as one example will show.

I used to make a mock occultation and get boys to time it with stop-watches. What we got was a scatter from which we could calculate a central value. I deliberately did not have any electrical timing device connected to the apparatus. I was concerned to emphasise the inevitable scatter of observations and what to do about it. When, after about four tries we had got the scatter down to acceptable limits (inside two seconds) with only a few outliers, I would start teasing them a bit by switching off in mid-sentence, to teach them to keep

their minds on what they are doing. I would point out that distractions do occur, either from sheer tiredness of waiting, or because a cat-fight has broken out at your feet at the critical moment as once happened to me.

I used also to make them check the absolute time against the clock or where possible against the speaking clock. I would make them do this in the dark, in case the light had gone in the telephone booth and also to make allowance for mis-reading the stop-watch. This meant starting the watch at the occultation and stopping it at the telephone. It could then be read again in a good light. With the cheaper stop-watches, misreading is a serious source of error. For classroom purposes all using the same clock (reading in seconds) the raw scores will all be different (militating against cheating) but the calculated results should agree closely.

Astronomy is the oldest of the sciences. It uses perhaps the most sophisticated apparatus of any science, yet there is room for the amateur to do useful work. It gives younger boys a great kick to be doing "real science". (Girls too, but in my experience to a lesser extent). It stresses teamwork, and that an experiment is not finished till it has been written up and sent to the appropriate quarter. How many good observations are lost through failure to do this!

Incidentally, operating as a school society we used to get "O" levels in our spare time. I did not press for this. Boys just took it in their stride, in their fourth year. I would not let them do it in their fifth year so as not to interfere with their official subjects.

GERARD RAWLINGS, FRAS

* * *

Teachers have asked:

Examination Type Question

Frequently the O level astronomy examination poses a problem in the Electro-magnetic section, which requires a knowledge of the Doppler effect and use of the formula -

$$\delta\lambda/\lambda = \frac{v}{c}$$

The problems are not really as difficult as they may appear to be at first sight to those who are unused to them. The idea of course is to test the candidate's ability in the arithmetic required at this level, and a knowledge of the various spectra such as bright line and absorption (Fraunhofer) lines.

Generally speaking the problems needs must follow a certain pattern that will show the candidate's understanding of the wavelength shift due to the Doppler effect; that's it.

So for the History/Geography etc. teachers who are trying to help the self taught pupils through the course, lets start by breaking down the formula

$\delta \lambda$ = difference between the observed (δ) and standard (λ) wavelengths, eg. the 'shift'

V = Velocity of the source (either approaching or receding).

C - Speed of light, 3×10^8 m/s or 3×10^5 K/s

Here is an example; the values are the same as those used in a previous examination paper. You are required to find the speed/velocity.

$$\delta = 5020\text{A}, \quad \lambda = 5000\text{A}, \quad \therefore \delta \lambda = 20\text{A}$$

$$\frac{20}{5000} = \frac{V}{3 \times 10^8}$$

$$V = \frac{20 \times 3 \times 10^8}{5000}$$

$$V = 12 \times 10^5 \text{ m/s} \quad \text{or} \quad 12 \times 10^3 \text{ K/s} \quad (\text{receding}).$$

So, there is no need to be over worried about these questions, provided that a little study is made of spectra in general and the manner in which the Doppler effect works, in particular.

P.R.J.

* * *

With regard to the worked answers to "O" level type questions published in the last issue (Vol.3, No.1), and the further discussion on one of these in this issue (previous page), I must apologise to the London University Entrance and Schools Examinations Council for inadvertently omitting to state their source. Any "O" level questions are, in fact, reproduced by kind permission of that Council and the AAE gratefully acknowledge their granting of this concession.

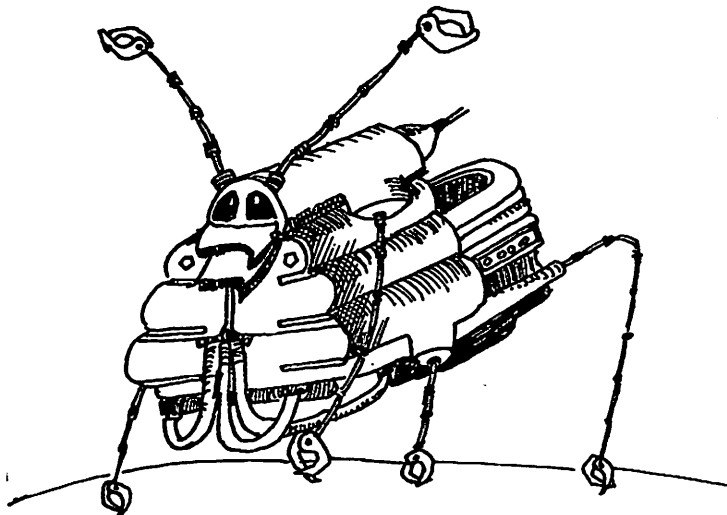
I am further required to state that, "the University of London Entrance and Schools Examinations Council accepts no responsibility whatsoever for the accuracy or method of working of the answers given". Obviously we will also willingly comply with this condition, but would point out to our readers that these articles are submitted to us by the Chief Examiner himself.

Ed.

* * *

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SPECIAL EVENTS

THE LONDON PLANETARIUM

Marylebone Road, London NW1 5LR

From January 1st we shall be showing two new programmes:-

During term time: "Skywatch" - a basic introduction to astronomy with a brief look at the latest information from planetary spaceprobes. This will be shown on Monday to Friday inclusive, every forty minutes from 12.15 p.m., in addition to our regular schools' programmes at 11.00 a.m.

Weekends and Holidays: A lighthearted programme called "Star-Trite" will be shown every forty minutes from 11.00 a.m. Its theme, loosely, is the evolution of life on the earth, and elsewhere in the universe.

Both programmes will be running throughout 1984.

On Tuesday, 10th January, 1984 at 6.30 p.m. we shall be holding another Teachers' Promotion Evening at the Planetarium, at which, as well as showing what the Planetarium has to offer, a preview film of the BBC "Zig Zag" series on astronomy and space will be shown. Further details and free tickets from me.

Undine Concannon
Planetarium Secretary

* * *

SHEFFIELD ASTRONOMICAL SOCIETY

50th Anniversary, 1934 - 1984

We warmly welcome you to attend a one-day symposium to celebrate our Golden Jubilee Year.

Date - Saturday, 7th April, 1984

Venue - Friends Meeting House, Hartshead, Sheffield

Speakers: Dr. David Hughes, "Halley's Comet - Its past and future"; Bob Christy, "Space Anniversaries"; Nigel Henbest, "The New Astronomy"; Patrick Moore, "The Outer Solar System".

(continued)

With an EVENING PUBLIC LECTURE by Heather Couper, B.Sc., FRAS. - "Exploding Galaxies and Cosmic Dragons";

plus . . SPECIAL GUESTS, EXHIBITION AND TRADE STANDS

Astro Books, Peter Drew of the Amateur Astronomy Centre, Norman Fisher Ltd. and Speedibrews.

Admission by ticket only - Cost £3.00 including Evening Lecture and morning coffee and afternoon tea.

Full programme, times, list of eating places for lunch and dinner, directions, map, etc., will be sent nearer the date.

Apply now stating full name, address, name of Society, together with cheque or postal order, payable to:
"Sheffield Astronomical Society"

to: Mrs. Nora Betts, Honorary Secretary, 35 Upper Albert Road, Sheffield, S8 9HS. Telephone: 0742 53196.

* * *

P O N L A F

POLYTECHNIC OF NORTH LONDON ASTRONOMY FORUM

A Resource Centre of the A.A.E.

27th January, 1984 - Astronomy for All!; Robin Gorman, Chairman of "National Astronomy Week 1985" Committee.

24th February, 1984 - The Interstellar Medium: Variations on a Theme. A collective talk by three research workers from the University of London Observatory; Mrs. Lindsey Jacobs, Mr. Paul Rees and Mr. Mark Ashfield.

23rd March, 1984 - Amateur Telescopes - A demonstration and discussion by members of the Astronomical Society of Harringey.

All meetings commence 6.30 pm in Room 11/3, Tower Block, Holloway Road, (almost opposite Holloway Road tube station, Piccadilly line). The talks will be followed by refreshments and informal discussions on topics of astronomical interest. Fee: 50p per evening (10p for those under 18). Anyone attending a lecture automatically becomes a member of PONLAF and can use its facilities.

READING ASTRONOMICAL SOCIETY

Meetings are held in the Anderson Church Hall, Amherst Road, Reading, Berks., from 7.00 to 9.45 p.m.

Hon. Secretary: Mrs. Muriel Wrigley, 30 Amherst Road Reading, RG6 1NU, telephone Reading 62180.

P r o g r a m m e

Monthly Sky Outlook by Jan Fiolka

January 21st - Meteors and their Observation, by Guest Speaker, Dr. J. Mason (Asst. Section Director BAA).

February 18th - Australian Observatories, by John Wrigley.

March 17th - Photographic Techniques for the Amateur by Dennis Hayden.

April 21st - Exhibition of Members' Gadgets and Photographs, and President's Prize Entries.

* * *

SHEFFIELD ASTRONOMICAL SOCIETY

1934 (50 YEARS) 1984

Golden Jubilee Year Programme

January 20th - "A Planet is a Cold Body"; Professor G.H.A. Cole, Ph.D., D.Sc., F.R.A.S., F.Inst.P., University of Hull.

January 27th - Informal Meeting.

February 17th - "Building and Operating a 40cm Telescope"; Philip Heppenstall, Huddersfield A.S.

February 24th - Informal Meeting.

March 16th - "Saturn"; Alan W. Heath, Director of the B.A.A. Saturn Section.

March 23rd - Informal Meeting

April 6th - Civic Reception with the Lord Mayor, Town Hall, Sheffield.

(continued)

April 7th - 50th Anniversary Symposium, Friends Meeting House.

April 11th-29th - "A Golden Age of Astronomy and Space". Exhibition at the City Museum, Weston Park.

For further information of any meetings, contact:-

Mrs. Nora Betts, Honorary Secretary, 35 Upper Albert Road, Sheffield, S8 9HS. Telephone: Sheffield 53196.

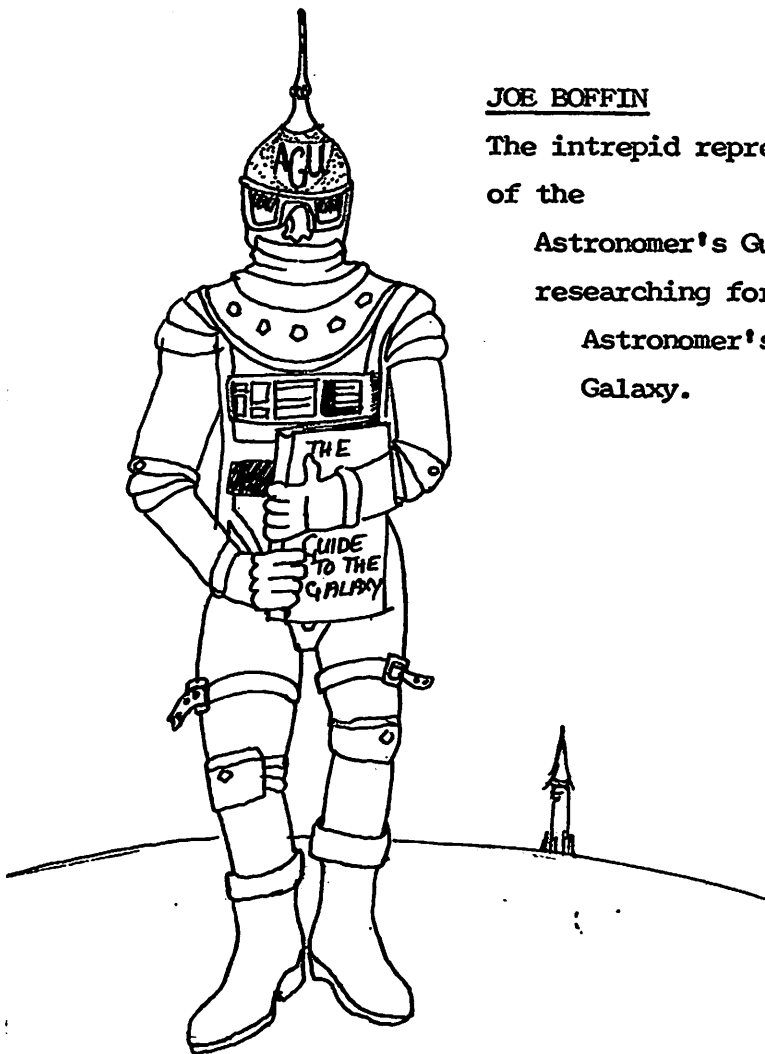
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* * *

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* * *

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