

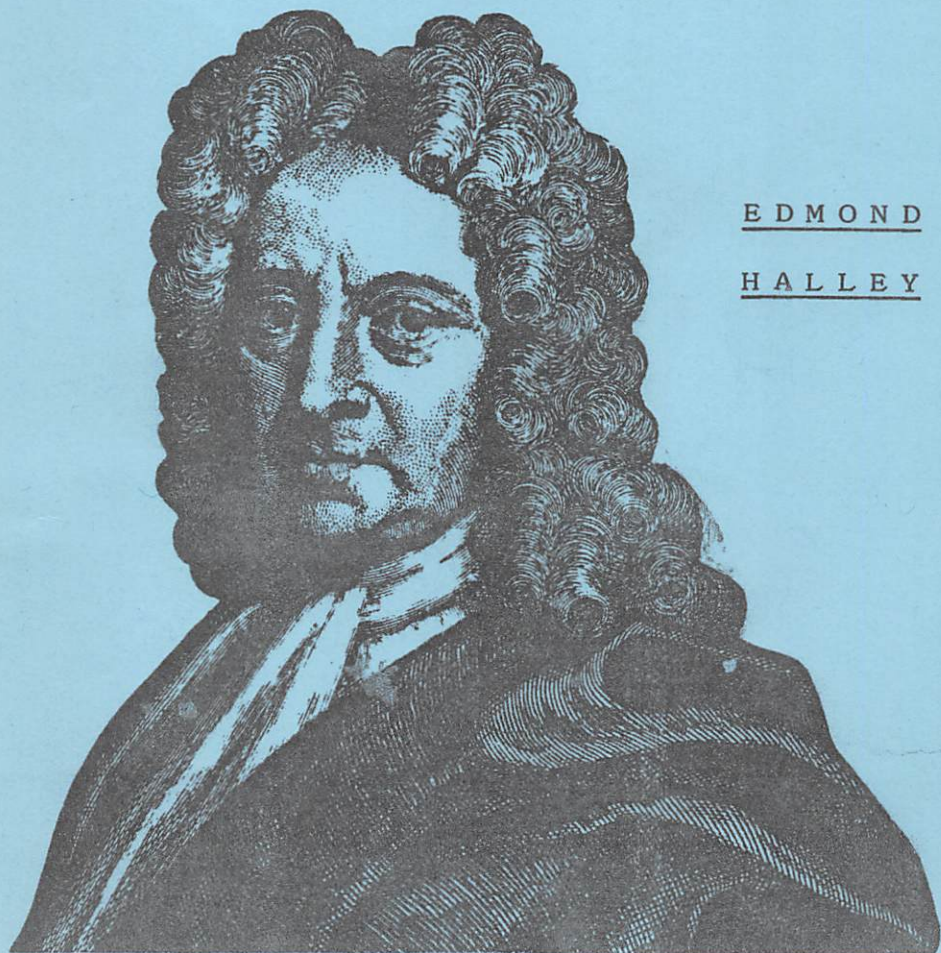
NEWSLETTER

of the

*Association for
Astronomy Education*

Vol. 4, No.2

January, 1985



EDMOND

HALLEY

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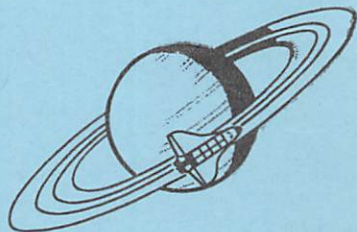
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EDITORIAL

Welcome to 1985 - a year which promises much for Astronomy.

Beginning with Spacelab 3, and ending with Spartan 2, it sandwiches in between (to mention only three events), the investigation of Comet Jacobini-Zinner, the launch of Giotto, and our second National Astronomy Week. Events such as these offer the AAE, the BAA and Local Astronomical Societies unrivalled opportunities to arouse public interest in the subject. They should not be missed.

I would also hope to see this Newsletter play its own small part during the year, acting both as a channel for the flow of information and a catalyst to stimulate enthusiasm. In order for this to happen I need more information, more articles and more letters. Items of topical interest are a priority. In addition, however, I desperately need material on introducing Astronomy to schools, equipment reviews (with schools in mind) and details of forthcoming society events which may be of more than local interest.

There must be vast mines of information deposited among our readers, and as yet, untapped. Please extract some and deliver it to me, as soon as possible. It does not matter if the form is crude, I will attempt to refine it. It doesn't matter if you have never done such a thing before, after all, I never even edited a newsheet previously!

* * * *

ASSOCIATION NEWS - FROM THE SECRETARY

I am writing this note, shortly after attending our course at Alston Hall, Preston. This lovely old rambling country house is well situated for viewing the skies at night, and in the next field is the Preston Poly's observatory which houses a 14" refracting telescope, and which is most kindly put at our disposal whilst on the course by Dr. I. Robson. Our thanks to him. Add to this the massive and frequent meals of Mrs. Lightfoot, the Principal, and I cannot see for the life of me why the courses are not better attended.

There were - and always are - good speakers and excellent lecture room facilities. The speakers go to great lengths to cart models and classroom projects about with them to enliven educationally the points that they try to put across, and are themselves, mines of information and experience.

Teachers therefore can have a pleasant weekend break in the country and actually return to work more developed and cognitive people.

So why are these courses not better attended? Actually they run at about 50% capacity, which is fair enough, but it would be gratifying to see our own teacher members make them oversubscribed and, at the same time, help themselves. Not all the participants are teachers or for that matter educationists.

Knowing the devotion of teachers to duty, even now in these 'dark days', I can only assume that our members are troubled by cost. This naturally is a very real concern. May I therefore state that it is not as expensive as one might think. The rail fare from London, cheap weekend away, is £30.00 and I am sure that there are still cheaper deals (I for instance have just heard of the Persil offer). At Preston the cost of the course is £35.00, so we are talking in terms of £70.00 for the weekend. The food - peace - tranquillity is worth that alone. So, if you only go on ONE course a year, why not make ours the one for one year anyway! Also, as these courses are backed by the D.E.S., some L.E.A.'s might well be disposed to lending a helping hand.

However our thanks to Dave Harris for providing us with another first class teachers' course on classroom Environmental Science, sorry, I meant Astronomy!

Halley's Comet is making more publicity this apparition that at any other in its history. I love this quote seen in a review in 'Bookshelf' (Pop.Ast.). "Like an exclamation sign in the sky, it often limps past the Sun virtually unnoticed". (Shades of '86?) However we, of the AAE, will continue to monitor progress and keep you informed. Our fact and positioning sheet is nearly ready for distribution and our thanks go to Colin Goodman and Fiona Vincent for their helping hands. That spans Hinckley to Dundee! Our membership is certainly widespread.

Lastly, I note that the Amateur Astronomy Centre at Bacup seems to be progressing as per schedule. When finished this will be a wonderful practical observatory and resource centre for amateurs. As the director, Peter Drew, is a member of our Association and has a keen interest in education, we shall be working in close liaison with him. I don't doubt that both our organisations will benefit.

Cheerio for now.

Peter

* * * *

REACHING FOR THE STARS

"You can take an 'O' level in Astronomy, you know," my son remarked, as he peered at the moon through his telescope. "Why don't we have it as a subject on the timetable at school?"

"I suppose it's because it would be rather a narrow topic," I said, seizing on the first thing that came into mind. He gave me a quick, rather delighted smile.

"I would have thought it might be considered quite spacious," he said.

I turned the hot tap on with my left foot. Having got off to a good start I realised that he was unlikely to leave the topic alone in a hurry.

"I didn't mean narrow in quite that sense," I said. "I meant that it's all the same sort of thing and not closely related to the world we live in."

"You must be joking," he said. "You must think that the whole of living is a joke?"

I could tell from the slight note of excitement in his voice that he thought he was about to score another point. "Why do you say that?"

"Because you don't appear to have heard of gravity. How can it be unrelated to the world we live in when the world we live in is part of the universe?"

I decided to change course.

"It wouldn't be easy to teach," I said, "all visual aids disappear during school time and are available only when it is dark. You'd have to go to school in the evening to learn it and you wouldn't like that." This seemed to take him up short; it was, I thought, rather a clever point.

"The practical work could be homework," he said reflectively. "As a matter of fact it is the only rational justification of homework I've ever heard."

Privately I thought he had a point, and wished I'd been quick enough to make it myself.

"But," he went on, "with video tapes and such you can show the sky at night anytime you like."

"It would be rather a bore," I said, "and probably too difficult for most children, for, you know, the mass of mankind just isn't interested in it." He didn't answer for a moment as he was making an adjustment.

"I suppose when the first man landed on the moon nobody bothered to watch," he said.

"That was rather different," I said, "it was a moment of history."

"A big step for mankind," he said lightly.

"Yes," I said, uneasily.

"With endless repercussions."

"Yes."

"Heralding a new age of discovery."

"Perhaps."

"But not worth teaching at school in any systematic way."

"It's touched on in science, no doubt."

"But it's a whole field of science in its own right," he said.

"There are too many fields of science in their own right" I said, regaining some confidence. "All we can do is touch on them and link them to a general pattern." He gave me a rather scornful look.

"You teach dull children Geography," he said. "You teach

them the names of countries and towns they'll never see. You tell them how Eskimos live and what it's like on the Equator, although they are unlikely to go there, and if they should they would soon find out."

"That's to give them some idea of the size of the world, and help them to place themselves in it. It is after all the world we live in."

"And yet," he said, "they can see the stars stretched out before them. They have no idea how far they are away. The sun and moon are part of their daily lives and you say it's all too difficult or boring for them. Why they might enjoy walking home at night when they'd missed the last bus if they could recognise the Great Bear and call a few stars by their names. They might even find their way if they were lost."

He does tend to get rather carried away, and being young has rather a starry eyed faith in the effectiveness of education.

"It's a bit of a dead science," I said, without really thinking. "Too factual. There's too much known about it. It would come down in the end to a string of boring facts. Science should be experimental and pupils at school should be taught how uncertain we are about many things and that new discoveries are being made all the time."

By now he was laughing himself sick.

"You sound as if you are describing Astronomy," he said. "If what you say is true every single point applies to Astronomy. Think on."

"But for a subject to be studied in its own right it ought to be linked up with other things," I said, getting irked. "Astronomy is too isolated a field. One wants to integrate one subject with another in any sensible school curriculum."

"I suppose you teach history starting with the Greeks," he said scornfully. "Nothing happened before recorded history!"

"Not really," I said uneasily.

"But the whole of pre-history is an aspect of Astronomy. And as for Geography is there any field-work done that

isn't based on the retreat of the ice-cap? Isn't that part of Astronomy?"

He was warming to his theme, and for some reason thought he was winning the argument.

"And what about poetry? There must have been more written about the moon than about any other topic. And R.E. All early religions were based on man's wonder when he contemplated the heavens. The gods took their names from the planets, not the other way round. He peered through his telescope. "Why, even God's supposed to be up there somewhere."

I have always found it best to be generous and let him think he is having the best of a dispute. And the bath water was getting cold.

"There is really a lot in what you say," I acknowledged. "I'll have to think about it."

But he wasn't listening.

"Quick, look at this," he said, "before it moves."

It was a section of the moon in perfect focus. The intensity of light and the sensation of infinity one gets when looking at the moon through a telescope probably accounts for it, but the sheer beauty of the sight, I had to admit, was breath-taking. It was the end of the discussion, for it left us both with a feeling of awe.

I was dressed and was downstairs, sitting by the fire, before he referred to it again.

"I think seeing the moon through a telescope is an experience everyone should have," he said quietly.

I looked into the fire.

"I'm not sure that I have anyone with the right qualifications," I said, musingly. "It must be a shortage field. And they talk a lot nowadays about the need to fit qualifications to the curriculum."

He wasn't sure whether I was serious or not and allowed a look of scorn to drift into a half smile.

Robert Spooner, Head of Foxwood School, Leeds

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A LOOK INTO THE PAST

Astronomy for schools is by no means a new idea. This summary of its history is taken from a paper that I gave at a BAA meeting in 1972 (Journal BAA, 83 (2) 112). 120 years ago Rugby School acquired its observatory, and the Devonshire Committee of 1875 reported "..... playing an important part in the science education" There were text books too. One by Sir Norman Lockyer "for use in schools", and another by Sir Robert Ball "for pupils in the higher classes in schools". Someone must have bought them; my copies are respectively the sixth edition 1876 and the fourth edition 1887. After that educational interest in astronomy seemed to die out, presumably because by the turn of the century schools were beginning to have laboratories and taught chemistry instead. To economise in space I must now adopt a note form.

1913: E.O. Tancock, then teaching at Giggleswick, wrote up his lessons as an admirable text book for middle forms, including classroom and outdoor exercises.

1917: The report of the J.J. Thomson Committee on Science in Education was published. It was a plea for widening the curriculum; it included astronomical phenomena at the age of 12 and the history of astronomy for the 16-18 group. This report probably triggered off the General Science movement after the war.

1929: One of the first comprehensive General Science books, by L.M. Parsons of Westminster City School, started with astronomy in two chapters followed by two on associated geology, and about the same time C.H. Dobinson published an outstanding text book, like Tancock for middle forms, based on his lessons on astronomy and geology at Mill Hill.

1935-38: The Science Masters' Association (now ASE) published reports on general science. A course on astronomy similar to that of Tancock was proposed for the two-subject science paper of the School Certificate (now 'O' level). It became an optional section in the papers of several boards and as far as I know still exists although the subject title has changed. The option was rarely exercised!

1944: E.A. Beet of Pangbourne Nautical College wrote a text book for the aforementioned syllabus and also based on lessons actually given. It lasted for twenty years, sharing the market with one or two other authors, and some years later it was followed by a little book on teaching astronomy.

1946: Common Ground Ltd. commissioned a series of film strips from members of the BAA. From then until 1960 eight were produced, two each from Tancock and C.A. Ronan and four from Beet. Remembering that, unlike text books, it was a case of only one copy per school, they were taken up quite well. They were discontinued when the firm was taken over by Longmans.

1954: Reading University Institute (now School) of Education, under Professor Dobinson, introduced a short course on the teaching of astronomy for in-service teachers. This lasted until 1979, after the professor had retired.

1958: The Ministry of Education (now DES) held a five-day course on astronomy at Alston Hall, Preston, conducted by three HMIs.

1958-60: There were extensive discussions in the SMA about the modernisation of science teaching, and syllabuses were duly published. The Physics one included astronomy very similar to the 1938 proposals for general science. This led to, or was overtaken by, the Nuffield Project.

1960: The Esso Petroleum Company organised a series of loan sets of books and equipment for teaching science in Preparatory Schools. One of the six units was astronomy and included a cardboard telescope (Charles Frank) which the schools could keep when returning the rest of the pack. The scheme lasted until such schools began to get their own facilities for the new Nuffield science courses.

1962: Durham University examination board introduced a special 'O' level paper in astronomy for nautical schools. This was soon transferred to London, became generally available in 1966, and must be well known to readers of this journal.

1963: Nuffield 'O' level syllabuses. The physics

included a section, mainly historical, on astronomy; many teachers found it too difficult for the average 15 - 16 candidate.

1966-70: Nuffield Secondary Science for younger pupils included some astronomy, but the pilot schools in which it was tried found it unsuitable as their pupils, being mainly town based, could not see the sky. It was replaced by a simple form of space studies.

More recently the RAS Education Committee had a rather too ambitious scheme for Teacher Training Colleges; two of its units were in use when the project was abandoned in 1977 - the Colleges had been abolished. The BAA Education Committee has long dealt with enquiries from teachers and provided "hand-outs". It also published a booklet in 1980 of annotated photographs of the Solar System suitable for cutting out and mounting or filing (still available, 60p for callers, 80p by post; the Careers booklet is temporarily out of print).

The rest you know. The DES has shown some interest in astronomy since 1975. A conference of interested parties was held in the rooms of the RAS in March 1979. The DES residential conference at Hatfield Polytechnic was held in January 1981, and the AAE came into being in the following October.

Postscript: Of course the foregoing is not the whole story. There are, and have been for some time, educational projects promoted by departments of Local Authorities and other organisations. Astronomy for the young is a growth industry.

E. A. BEET

/concluded

* * * *

QUOTES

The point of view of a sinner is that the Church promises him hell in the future, but cosmology proves that the glowing hell was in the past.

Ja. B. Zel'Dovich

The doors of Heaven and Hell are adjacent and identical.

Nikos Kazantzakis

PLACES TO VISIT

ASTRONOMY AT GREENWICH 1985

Thousands of visitors each year visit the Old Royal Observatory at Greenwich, to see the permanent displays of historical instruments. Inside Flamsteed House, the home of the astronomers, are collections of astrolabes, orreries, sundials, telescopes and clocks to name but a few. A second building houses the original astronomical instruments used at Greenwich from 1675. These include transit instruments, from the first to be used in Britain by Edmond Halley, to the large Transit Circle designed by Sir George Airy and used regularly to 1954. This telescope, known as the Airy Transit Circle, is the telescope which defines 0° longitude. It was restored for the zero longitude centenary last year and is still in full working order. It is occasionally demonstrated but is well worth seeing at any time.

The telescope not to miss, which it is hoped to open to the public during the school holidays in 1985, is the 28 inch refractor, the largest refractor in Britain and the seventh largest in the world. The demonstrations were started in 1984 and proved very popular. When the Moon and planets are in favourable positions during the day and there is no cloud it is possible to make observations. Both telescopes can be privately demonstrated to groups by arrangement with Astronomy Section staff; telephone 858 1167 before you intend to visit.

A continuing facility of the Old Royal Observatory is the Greenwich Planetarium situated in the dome of the South Building. Here private programmes and special courses for schools are held as well as public lectures in the afternoons. There is a small charge payable at the door, which opens half an hour before the programme begins. The private programmes include such titles as:- The Universe from Beginning to End; Journey through the Solar System; Return of the Comet; Legends of the Sky; The Paths of the Planets; The Red Planet; The Lives of the Stars; Beyond the Milky Way; Voyage to the Moon and The Story of the Universe. For further details and to book contact the School's Liaison Officer at the National Maritime Museum; telephone 858 4422.

(continued)

1985 sees the very first Greenwich Astronomy Day, a day at Greenwich for all keen amateurs to share their knowledge and interest with the professionals. This is taking place on the 23rd November 1985 in the National Maritime Museum. The provisional programme at the time of writing includes speakers on: The work of the amateur astronomer; The future in space; Halley's comet, and Astronomy as a hobby and a career.

The day will also include a short visit to the Old Royal Observatory followed by a demonstration on how to make a telescope and a short planetarium programme for those who are interested. The day is intended for students of 15-18 years, but everyone is welcome. There will be a fee for the whole day which includes refreshments. There is room for a total of eighty people so make sure you book your place some time in advance. Further details will be available nearer the day.

The big astronomical event of 1985 without doubt is Halley's Comet. Spaceworks is an exhibition which will give you all you want to know about the comet. It begins in November 1985 and runs all through 1986. It is being held in the National Maritime Museum. The exhibition has been timed to coincide with the next close approach of Halley's Comet, and will make a special feature of this and the Giotto satellite mission to the Comet. Although the exhibition has a serious purpose, it is hoped to present it in an interesting and entertaining way that will appeal to a broad spectrum of the public, centred on the intelligent teenager. The visitor will first be introduced to the Solar System, then comets (with particular emphasis on that of Halley) before moving to the remainder of the exhibition which will show how artificial satellites can be used for communications, navigation and the study of the Earth, planets, stars and the satellite environment. Finally there will be a section on the proposed space station and some artifacts associated with manned space flight.

If you are interested in joining in any of the Greenwich events please remember to contact us in advance.

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SOUTH TYNESIDE COLLEGE

South Tyneside College is a very new institution having been set up only on 1st September, 1984 but its constituent parts have a long and noteworthy history.

The former South Shields Marine and Technical College possesses the first teaching planetarium to be built in the U.K. The instrument, a Spitz A3P projector, is twenty years old now and has experienced a number of changes in role, but it is still operated primarily as an educational facility.

The planetarium is available to school parties during term time, but prior notice is essential as we have seating capacity for only 75. Bookings may be made by telephoning South Shields (0632) 560403 ext. 40 or by writing to The Head of Department, Department of Nautical Science, South Tyneside College, St. George's Avenue, South Shields, Tyne and Wear, NE34 6ET. Visits are free to schools within South Tyneside Education Authority but for schools outside our home area a charge of £10 per visit is levied. If sufficient notice is given, programmes may be designed to suit the individual requirements of visiting parties. School groups may also visit the College Observatory which is equipped with a 40 cm Newtonian reflector.

In addition to the services mentioned above, South Tyneside College offers instruction in astronomy, ranging from general interest courses such as "Observational Astronomy" and "Everyman's Astronomy" to GCE 'O' level Astronomy and an in-service course for teachers. A programme of public planetarium performances is also presented. These take place on Thursday evenings and details of titles, times etc. may be obtained from the address above.

* * * *

SOUTHEND PLANETARIUM

This planetarium is the only one in South East England outside London itself. Opened in January 1984 it was built by Harry Ford, formerly of the Mills Observatory, Dundee, Scotland, and his wife. Southend planetarium serves especially the area of Essex and East London, stimulating activity from many schools in the district.

More than three thousand visitors have been to the planetarium since opening, and the programmes are orientated towards an introduction to Astronomy for first year, but most 7-10 year olds are appreciative.

The four metre dome is of fibreglass, treated with flame resistant paint, assembled inside an upstairs room at Southend Central Museum in Victoria Avenue. Semicircular padded bench seats accommodate 22-25 viewers around the projector pedestal. The projector itself is of interest, since although it resembles small commercial models for classroom use (as newly fitted at Mills Observatory, Dundee) there are significant differences in detail.

The star globe, 30 cms in diameter, projects some 300 stars to mag. 3 with some 4th mag. to fill the sky. Projection is pinhole from a 3.5v 0.3amp bulb controlled by rheostat. Milky Way image comes from a drum diffuser mounted on the star globe. Images of the Sun and Moon have had a different treatment. Solar and Lunar images are formed by light bulb, condenser lens and imaging lens, so the images are bright as well as sharp. The Sun setting leaves an afterglow in the sky and this is also apparent before the sunrise. The Moon's image is formed by tiny transparencies of different phases, each with naked eye maria, set around a cylinder on the solar system drum. Rotation of a knob moves the imaging lens round the differing phases in turn and they will appear on the screen in the correct position relative to the Sun.

The planets are not driven mechanically. I use a "gun" held in the hand which projects a pinpoint but bright "wandering star" against the ecliptic. Since it is hand held then the planet can be moved rapidly across the sky to show retrograde motion of outer planets or elongations of inner planets Mercury and Venus.

A proper programme includes shower meteors and fireball, a comet, Aurora, Supernova and gas shell, all with explanations of where and when they may be seen and the mechanisms behind them. Constellation figures of the Great Bear, Orion, Cassiopeia and others are projected, as well as the R.A. Dec. and ecliptic co-ordinates. The latitude of the observer can also be changed by a worm gear.

This use of elaborate lens projection means also that enlarged images of planets, shuttle and astronaut can float overhead in a realistic fashion; but even simpler projectors create the images of a spinning Galaxy or Voyager 2 in this planetarium "sky".

Local teachers and children also appreciate the planetarium horizon, which has round it all the well known buildings of Southend itself.

I will be delighted at any time to show association members the planetarium, or to arrange a school outing. Southend planetarium is a private enterprise project with the blessing of the District Council, so a small fee is payable. There are seven possible performances per day Tuesdays to Saturdays. The usual price for a school party of 25 is £15 for the three quarter hour programme. The projection systems being developed here are creating great interest among others working in the same field, and indeed copies are being made for other establishments.

Details of Southend Planetarium are available from me at the above address. Telephone: 0702 330214.

* * * *

QUOTES

"We had the sky, up there, all speckled with stars, and we used to lay on our backs and look up at them, and discuss about whether they was made, or only just happened!"

"Huckleberry Finn"
by Mark Twain

THE spacious firmament on high.
With all the blue ethereal sky,
And spangled heavens, a shining frame,
Their great Original proclaim.

Joseph Addison

* * * *

"ASTRONOMY"

"DIURNAL MOVEMENT", "MAP OF THE SKY",

"THE EARTH AND THE PLANETS"

Three slide sets of ten slides each, with notes, in plastic wallets.

Audio Learning Limited, Unit 1, The Works, 105a Torrignano Avenue, London, NW5 2RX. Prices unknown.

I was very surprised when I came to view these slides and read the accompanying notes. The general quality of both is awful.

The slides and notes are from a French source, "Encyclopedic Visuelle". Nothing wrong with that. But the notes have been badly translated from French, and slides containing diagrams have been left in the French language. The result is that the notes are almost useless for any teacher who does not already have a knowledge of astronomy. For people who do know some astronomy, the text is irritating. For example: the "Diurnal Movement" set refers to "horary" (meaning right ascension), "radio-electric waves" (radio waves), and indicates that a telescope viewfinder "allows the observer to 'lower' the telescope onto the portion of the sky to be photographed"! Howlers abound in the (brief) notes with all three sets.

The slides themselves are a mixture of photographs and diagrams. The trouble with the former is that they are mainly copies of prints - as is shown by the reflective glare that often occurs, as when one is making - carelessly - a copy of a glossy photographic print. There are colour and monochrome images. Most of the photographs are out of date, e.g. a picture of Earth taken in 1959, and an old photograph of Mars ("Marys" as described in the text). Indeed, many of the images are similar to those in the "Larousse Encyclopedia of Astronomy", which dates back to the 1960's.

All the above is not to say that some of the slides are not of value. I do like the set of four in the "Diurnal Movement" set, which shows the passage of the Sun across the sky at hourly intervals, as a series of vertical

strips in colour which, taken together, make up a panorama. It was interesting to see some examples of old star-charts in the "Map of the Sky" set; and a plate showing early drawings of Saturn in the set on "The Earth and the Planets".

Some of the slides could be used with benefit by a discerning teacher. However, I would not recommend them for purchase.

Geraint Day

* * * *

TEACHERS' PAGE

"All London University 'O' level questions are reproduced by kind permission of the London University Entrance and Schools Examination Council, who accept no responsibility for the accuracy or method of working of the answers given."

Example:-

A distant galaxy is observed to have a red shift of 0.1, where the Hydrogen spectral line of 4861 \AA° (486.1 nm) is increased to 5347 \AA° (534.7 nm).

Calculate the recessional velocity of the galaxy in km/s (kms^{-1})

$$\frac{\delta\lambda}{\lambda} = \frac{v}{c} \quad (c = \text{speed of light, } 3 \times 10^5 \text{ in km/s})$$

$$\delta\lambda = \frac{5347}{4861} \quad \therefore \frac{486}{4861} = \frac{v}{3 \times 10^5}$$

If we assume 4861 to be 4860 for the convenience of easier cancellation, then we can assume that:

$$v = 3 \times 10^5 \times \frac{486}{4860}$$

$$v = 3 \times 10^4 \text{ km/s approx.}$$

Q.E.D. (quite easily done)

LETTERS TO THE EDITOR

Dear Sir,

Some controversy has recently been voiced over certain aspects of the 'O' level astronomy examination.

I would like to have my two-bits worth as well. Indeed, hopefully it may shed light on one or two items which seem to have caused comment amongst our members.

Firstly a certain conflict of loyalties must exist over the use of the \AA Angstrom unit as distinct from the nanometre. Now the nm. is an S.I. unit used by teachers of physics whilst the \AA Angstrom unit, as you know, is (was) used by astronomers. We have a situation nowadays in astronomy where young people entering astronomy professionally are bringing with them the S.I. unit, and working with people who grew up with the \AA Angstrom. Also, when one reads books on popular astronomy, nine out of ten refer to the \AA Angstrom unit. These books more often than not, are the ones used by the 'O' level candidate, searching for information on the Doppler effect and famous 'red shift'.

Let us now turn to the administrative side; it may not be generally known, but it takes two to three years to get items in examination syllabuses changed, ratified, printed, accepted and ready for use. Having said that, the 16+ examination could well change the situation in two to three years time, so

The second point concerns the formula used: $\frac{\delta\lambda}{\lambda} = \frac{v}{c}$

which is well known to be only an approximation. It works nicely for sound of course, but when used with the electromagnetic spectrum, well, not so nicely, especially when the velocity of the source approaches a relativistic speed. However, so far no 'O' level questions (I think) have offered such figures. This in no way detracts from the premise that it is undesirable to teach something factually wrong - even if it is an approximation - cognisant of the fact that at a later date it will have to be untaught. So what is the excuse?

May I suggest an answer.

It could be a pragmatic approach which allows the pupil to actually work out the recessional speeds of galaxies, thus not only testing the skill of his figure work but bringing him to grips with reality in the "wonder of the heavens". It enables him also to test his own ability to tackle successfully certain of its problems.

If we are quite honest with ourselves, we already know that this formula has no chance of being used in adult life by the average person. It has served its purpose to show how things can be done. A student of astro-physics will realise its limitations without a second glance. Therefore, I for one, am in favour of keeping it in the syllabus - it works! And, as long as astronomers are prepared to quote wavelengths in Angstrom units, I will not be adverse to them. After all, this is a specialist paper so within reason, and in line with other specialist papers, let's retain those items which are special to it.

Peter Richards-Jones

ASTRONOMICAL SPENDING CUTS

Despite the recent withdrawal of the Secretary of State for Education and Science's proposals to increase by a large amount the parental contributions towards students grants, there remains another threat to education.

The Treasury intends to scrap millions of teaching aids of especial value to astronomers. Readers may recall earlier suggestions in this Newsletter (AAE News, Vol.2, No.2, page 33; ibid., No.3, p.52 - 1983) about the use of a Treasury note as a teaching aid in astronomy education.

By abolishing the £1 note, with its depiction of things Newtonian, we shall be deprived of a pocket reminder of a great British scientist. So far there do not seem to be any plans to demolish Sir Christopher Wren's edifice from the £50 banknote. But there will certainly be discrimination in favour of the better off, because of the rarity of this other currency compared with that bearing the image of one of the more illustrious Masters of the Mint.

Needs must insist upon a restoration of our noble Sir to his rightful location.....

Geraint Day

7 Poulton Street, Swindon, Wilts. SN2 1BH

ASTRONOMY AT LANCASHIRE POLYTECHNIC

(A) COURSES

The Polytechnic is fortunate in that it has two well equipped observatories with which to provide experimental facilities for courses in astronomy. Full-time students follow a B.Sc. (CMAA) Combined Studies Joint Honours course with astronomy as one option. The most popular combinations are astronomy and physics or astronomy and mathematics.

Part-time students following a B.Sc. in physics have the opportunity to include astronomy options within their programme of study.

Postgraduate and postdoctoral studies are also provided and currently there are two postdoctoral research assistants, three full-time and two part-time postgraduate students in astronomy. Other astronomy courses are organised and presented; these are wide ranging and are mostly held on an evening. Examples include: astronomy for teachers, astronomer badge for scouts, general evening course in astronomy, part-time day course, residential weekend on behalf of the British Astronomical Association.

(B) FACILITIES

The Polytechnic houses the staff rooms, lecture and tutorial rooms, mainframe computers (2 x Prime 750, 1 x Prime 9950), multiple dark rooms.

Jeremiah Horrocks Observatory, Moor Park, Preston

Observatory housing an 8-inch Cooke refractor and laboratory space for twenty students. Its main teaching use is for first year laboratories, evening courses and meetings of the Preston and District Astronomical Association. Other equipment includes 4x5-inch Celestron telescopes with accessories, 12 x 10x20 Zeiss binoculars, 2 x Olympus OM1 35mm cameras, 1 x Zenith 35mm camera, temperature controlled 0.5 Angstrom H-alpha filter, modified Hale spectrohelioscope, BBC-B microcomputer workstation with disc drive and printer, modem link to mainframe.

Alston Observatory

The site is seven miles north-east of Preston, adjacent to Alston Hall Residential College, and is used for second and third year undergraduate astronomy laboratories, third year astronomy projects and research.

WILFRED HALL BUILDING housing a 15-inch astrographic refractor and 15-inch refracting guider, plate loading room, objective prism, radio telescope receiver box, oscilloscopes, chart recorders.

M.A.T. BUILDING housing the Multiple Aperture Telescope (seven x 15-inch Cassegrain $f/9$ reflecting optics with fork mount - equivalent to a single collecting aperture of about 1 metre). Hilger microprocessor-driven high dispersion visible spectrometer, system controller HP87XM microcomputer, two cooled photomultiplier detectors, EMI PET-based photon counting system, HP printer, modem connection to mainframe, low-light-level integrating television camera, monitor and video recorder.

The site also has a twin mounted helical coil radio telescope interferometer operating at 151 MHz; a small dome housing an 8-inch $f/4.5$ Newtonian telescope for deep sky photography, 7 x 8-inch Celestron telescopes with full accessories used with 5 x BVRI PIN diode photometers, 1 x UVRI PIN diode photometer, 1 x UVRI cooled PIN diode photometer, 8-inch Cassegrain reflector for double star observations.

LABORATORY BUILDING at Alston Hall with library/tutorial/laboratory space, dark room, two BBC-B microcomputers with disc drives, frame digitising for the integrating TV camera, printer, plotter, modem connection to mainframe, microdensitometer, light boxes, plate measuring machine, travelling microscope, microfiche reader, chart recorder, laboratory experiments including a cooled B-V photomultiplier and pulse height analysis system.

(C) STAFFING

There are three full-time astronomy lecturers in the School of Physics and Astronomy. They are all active researchers and are supported by other academic and technical staff. A technician and part-time secretary are based at the Moor Park site which is also the Climatological Station for Preston (reporting to the Meteorological Office).

(D) RESEARCH

The research of the group members is concentrated on the following areas:- experimental high dispersion spectroscopy of shell stars with the M.A.T.; theoretical computer modelling of radiation transport through dusty envelopes surrounding stars and nuclei of galaxies; observations of the extent and composition of dust in the interstellar medium; studies of pre-main-sequence shell stars; multifrequency observations of Blazars; submillimetre observations of planets and asteroids; submillimetre, near and mid-infrared mapping of star formation regions; submillimetre observations of active galaxies.

Overseas facilities include the United Kingdom Infrared Telescope in Hawaii (UKIRT), the NASA Infrared Telescope in Hawaii (IRTF), NRAO 12-metre millimetre telescope at Kitt Peak, Anglo Australian Telescope (AAT), Very Large Array in New Mexico (VLA), Infrared Satellite (IRAS), X-ray Satellite EXOSAT. Collaborations exist with many groups both in the U.K. and abroad.

The work of the astronomy group and the observatories is described in the Report of the Director of the Observatories, published annually by the Polytechnic.

Dr. E. I. Robson,

Director of Observatories
Reader in Astrophysics

September, 1984

Rosemary
Naylor



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Association for Astronomy Education

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