COMMISSION 46
ASTRONOMY EDUCATION AND DEVELOPMENT
Education et Développement de l'Astronomie

Newsletter 59 – October 2003

Commission 46 seeks to further the development and improvement of astronomical education at all levels throughout the world.

Contributions to this newsletter are gratefully received at any time.

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http://physics.open.ac.uk/IAU46

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EDITORIAL

I was very pleased to be elected Vice-President of IAU C46, and I look forward to three years of working closely with our new President, Jay Pasachoff. I thank Syuzo Isobe for his hard work as President over the past three years. I will continue as Newsletter editor.

At the C46 Business Meetings in Sydney in July, four points were made regarding the Newsletter.

- Fewer hard copies should be mailed to reduce costs.
- The Newsletter should be made known to other organizations, such as planetariums, media, science centres, and relevant educators.
- IAU members should be encouraged to read it!
- It should have wider circulation within the IAU.

These are all excellent suggestions, and had I been able to get to the General Assembly I would have supported them, and even introduced one or two, if no-one else had.

Regarding the first point, the hard-copy mailing list was compiled in response to a survey we conducted in 1999, and the previous issue (March 2003) was hard-copied to 165 addresses. This year we also mailed the triennial reports supplement to the same list, which put up costs. I have now emailed the mailing list, with the default that no reply means the person will be taken off the list, starting with this issue. Everyone on the list has been reminded that the Newsletter is available on the website.

The remaining points are now being addressed. As part of this, we are getting a new Universal Record Locator, http://astronomyeducation.org, aliased to our existing site at http://physics.open.ac.uk/IAU46. We hope that the ease of remembering this URL will lead more people to rely on the site and to find it a useful nexus. Of course, if the Newsletter is to gain and hold a larger readership, we need good material, and that's down to you!

IAU C46 President and past-President, at the recent IAU General Assembly in Sydney in July 2003
From left to right, Julieta Fierro (Mexico, 1997-2000), Jay Pasachoff (USA, 2003-2006)
Syuzo Isobe (Japan, 2000-2003), John Percy (Canada, 1994-1997), Derek McNally (UK, 1973-1976)

Barrie W Jones
(for contact details see Officers & Organizing Committee of Commission 46)

MESSAGE FROM THE PRESIDENT

I have been pleased to work with many fine colleagues on the Commission for the past years, and it is an honor to have the opportunity to help further in the work as President. I view our job as worldwide, and I hope that the Commission on Education and Development can continue to act as a link among astronomers from many countries. We can each learn from the successes (and other attempts) of others.

Of course, the bulk of the Commission's work is accomplished in the Program Groups, so the roles of the Program Group Chairs and other members are the most significant for our activities.

The coming triennium is marked by one of the rarest scheduled events in astronomy: a transit of Venus. Though not a person on Earth has seen one – since the last one occurred in 1882 – we will have a chance on 8 June 2004. Though not as spectacular to the eye as a solar eclipse, the event is intellectually of the higher order, and I hope that we can use our links and liaisons to piggyback worldwide astronomical education. I will take it as the purview of the existing Working Group of Public Information at the Times of Eclipses to include the transit of Venus. After all, the transit is a kind of eclipse – though with a much smaller percentage of coverage.

We have already included some aspects of public information in our commission. Reports on the activities of planetariums have appeared in our Triennial Reports from National Liaisons, for example. In the United States and Europe, Public Outreach has become a more substantial activity, especially with the major space missions required to have substantial public outreach programs. A conference entitled Communicating Astronomy to the Public was held at the Keck National Academy of Sciences Building in Washington, DC, three months after the IAU General Assembly in Sydney. At its end, several of those attending felt strongly about organizing a vehicle within the IAU on Public Outreach. I am working to accommodate this new structure within our Commission, though it could wind up parallel to the Commission as an independent part of Division XII.

From the bureaucratic point of view, the change of the IAU from relying as much on Commissions to concentrating on Divisions could have a large ultimate effect on how we do our work. For the moment, we find ourselves as part of a motley crew of Commissions within the new Division, which, for want of a better name, is called Union-Wide Activities. Over this triennium and the next, I am sure we will see more of the tension between the individual Commissions and the Division.

I hope that our website, so ably maintained by our new Vice-President, Barrie Jones, with the assistance of Tracey Moore at the Open University, will be a help to coordinating our activities. We have arranged for a new Universal Record Locator, http://astronomyeducation.org, aliased to our existing site at http://physics.open.ac.uk/IAU46. We can hope that the ease of remembering this URL will lead more people to rely on the site and to find it a useful nexus. Among the items posted there are the minutes of our business meetings in Sydney.

We have also posted the significant Resolution on the Value of Astronomy Education (see also this Newsletter), passed by the IAU's General Assembly in its closing session. This set of goals and reasons is available for use by any member, or any non-member, to advance the worldwide spread of astronomy education to people of all ages.

With thanks in advance to my colleagues around the world who are interested in Astronomy and Development, I am pleased to write these opening remarks to help our Newsletter start our triennium.

Jay M Pasachoff
(for contact details see Officers & Organizing Committee of Commission 46)

IAU RESOLUTION ON THE VALUE OF ASTRONOMY EDUCATION

The following Resolution was proposed to the 2003 IAU General Assembly by IAU Commission 46, and passed by the National Representatives. The Resolution was first suggested by Magda Stavinchi (Romania), and was further developed by the Organizing Committee of Commission 46, with important contributions by Johannes Andersen (Denmark).

Considering
> that scientific and mathematical literacy and a workforce trained in science and technology are essential to maintain a healthy population, a sustainable environment, and a prosperous economy in any country
> that astronomy, when properly taught, nurtures rational, quantitative thinking and an understanding of the history and nature of science, as distinct from rote learning and pseudo-science
> that astronomy has a proven record of attracting young people to an education in science and technology and, on that basis, to careers in space-related and other sciences as well as industry
> that the cultural, historical, philosophical and aesthetic values of astronomy help to establish a better understanding between natural science and the arts and humanities
> that, nevertheless, in many countries, astronomy is not present in the school curriculum and astronomy teachers are often not adequately trained or supported, but
> that many scientific and educational societies and government agencies have produced a variety of well-tested, freely-available educational resource material in astronomy at all levels of education

Recommends
> that national educational systems include astronomy as an integral part of the school curriculum at both the elementary (primary) and secondary level, either on its own or as part of another science course
> that national educational systems and national teachers' unions assist elementary and secondary school teachers to obtain better access to existing and future training resources in astronomy in order to enhance effective teaching and learning in the natural sciences
> that the National Representatives in the IAU and in its Commission 46 call the attention of their national educational systems to the resources provided by and in astronomy, and
> that members of the Union and all other astronomers contribute to the training of the new, scientifically literate generation by assisting local educators at all levels in conveying the excitement of astronomy and of science in general.

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PUBLIC OUTREACH & COMMISSIONS VS DIVISIONS AT THE IAU

At the conclusion of the Communicating Astronomy to the Public meeting in Washington in October, several of the people present decided to form a group within the IAU on Public Outreach. Such topics are not formally represented within Commission 46, though we often include some public outreach discussions within our meetings or triennial reports.

As President of the Commission, I was in favor of adding a Program Group on Public Outreach. Our Washington meeting was chaired by Virginia Trimble, who is President of the new Division XII on Union-Wide Activities of the IAU. This Division includes

- Commission 5: Documentation and Astronomical Data
- Commission 6: Astronomical Telegrams
- Commission 14: Atomic and Molecular Data (US mirror site)
- Commission 41: History of Astronomy
- Commission 46: Astronomy Education and Development

- Commission 50: Protection of Existing and Potential Observatory Sites

Most of these Commissions have goals and aims quite separate from ours. The Commission on the History of Astronomy is the closest to our point of view.

The IAU is trying to reorganize so as to give more power to Divisions and less to Commissions. Virginia Trimble proposed having Public Outreach as a Working Group within the Division. This would make it more-or-less parallel to the whole Commission 46 on Education and Development, and in my view would lessen useful coordination and colleagueship. I have solicited the views of members of our Commission's Organizing Committee, and they overwhelmingly agree with me.

As of this writing, the matter is unsettled. The General Secretary of the IAU writes me that

> 'The need for a new and better IAU policy regarding communication of astronomy, in a broad sense, is currently being discussed within the [Executive Committee]. Various levels of the IAU would benefit from having access to an advisory body with regard to how to communicate astronomy. The IAU membership constitutes an enormous resource of knowledge which we do not make full and good use of, by far. We see the need to organize ourselves better within the Union to be able to take advantage of these resources. The public educational aspect is a very important issue and element which clearly will be best handled under Commission 46.'

The Executive Committee would be glad to hear from us as to our view of the whole range of educational and public outreach activities of the IAU. I would be glad to hear from any readers with their views.

Prospective members of the Program Group on Public Outreach are as follows.

- Co-Chairs: Ian Robson (UK, Deputy Director of the Astronomy Technology Centre at the Royal Observatory, Edinburgh) and Dennis Crabtree (Canada).
- Members: Lars Lindberg Christensen (European Space Agency Information Centre in Garching, Germany), James Hesser (Canada), Dennis Crabtree (Canada), Natalia Ruiz Zelmanovitch (Instituto de Astrofisica de Canarias, Spain), Susana Deustua (USA, the Director of Educational Activities of the American Astronomical Society), Terry Mahoney (IAC, Spain), Gabriel Perez Diaz (IAC, Spain), Arnout Jaspers (Netherlands), Nick Lomb (Australia), Anthony Fairall (South Africa), Alejandra Leon Castella (Costa Rica).

Jay M Pasachoff
(for contact details see Officers & Organizing Committee of Commission 46)

ISYA ROMANIA REVIEW

This is a review of ISYA-24, in Bucharest, Romania, 2003, organized by the C46 Program Group, International School for Young Astronomers.

Several rounds of email to participants led to a current email address for 38 of the 41 participants. The review request asked for academic and job progress and ISYA influence thereupon; specific memorable subjects, lecturers, practical activities including eclipse; whether ISYA provided a broader outlook on science and useful English practice; quality of living and educational conditions and resulting later contacts with other participants; suggestions for improvements. We received a good response: 10 out of 18 foreign participants and 10 out of 23 Romanian participants responded during March 2003. All the respondents valued the ISYA very highly. A high proportion is still active in astronomy/astrophysics.

Nine of the ten foreign participants are still active in astronomy/astrophysics.

1) One Algerian, who already had a PhD (signal processing), used ISYA for professional development to turn to astronomy. 'I learn about helioseismology from students of Uzbekistan and I initiated later this project in my institute (Algiers Observatory). I have an optimistic view of the development of astronomy in Algeria … I want to participate actively in this project and … the ISYA has brought a great contribution in this attitude.'

2) Seven of the ten expect PhDs (six of them in astronomy). The two Turkish participants will soon receive a PhD related to stellar spectra, having visited Saul Adelman in the USA for six months. The Uzbeki student expects a PhD on helioseismology within a year. The three Egyptians each expect to receive a PhD within a year. One Algerian is pursuing a PhD in seismology in France.

3) The two Vietnamese are still teaching university-level physics and astronomy, now with greater authority.

Seven of the ten foreign participants are still active in astronomy/astrophysics.

1) Seven of the ten had ten-month visits at the University and Observatory of Turin, Italy, or the University and MPI Radioastronomie, Bonn, Germany. (Three of them credit the Erasmus Program). Of these seven, five are now seeking PhDs: in the USA (two at the University of Alabama, advisor J Sulentic, one at Northeastern University, astrophysics), in Holland (one officially at Nijmegen, actually working at Fermilab USA), in Germany (one at MPI Aeronomie, solar). One is seeking the MSc in Osaka, Japan (X-ray astronomy), and one is researcher at the Astronomical Institute, Bucharest (gamma ray bursts, etc).

2) In addition, one teaches mathematics and informatics in high school in Bucharest, and is registered for a binary-star PhD topic in the Faculty of Mathematics, Bucharest University. One is starting a PhD thesis on statistical physics in Paris. One seeks a PhD at the Bucharest Institute for Physics and Nuclear Engineering (nuclear spectroscopy).

Many of the Romanians (and even some foreigners) are still in email communication with each other, in part due to four having been in Turin and three in Bonn. Noticeably, they keep in contact with Bucharest University, apparently thanks to Prof Rusu having created a real astronomical community within the Faculty of Physics of the University of Bucharest (Association of Amateur Astronomers), supported by the international activities of Magda Stavinschi (Bucharest Astronomical Institute).

Several participants praised the teaching (unasked): 'experience new pedagogical methods'; 'teaching methodology was effective'; 'our teachers have presented their courses with great devotion and passion'; 'I am impressed by D. Gerbaldi….'. Several praised the role of the participants' presentations. Only two mentioned the lecture notes as needed to compensate for slow English comprehension.

There was a large range of opinions on the practical activities. There were complaints: 'it was not well balanced between theory and practice'; 'I think that the experimental work, even at the level of processing existing data, was the weak point of that summer school'; and 'it would have been interesting to have a connection to some teams doing "real" eclipse experiments'. There was praise: 'the practical activities were particularly helpful, … my first contact with the kind of work an astronomer does'; 'the great benefit was the outlook on the experiments'; and 'I believe that some of the student experiments led by Prof Rusu during the solar eclipse yielded much more valuable results than some professional experiments'. (He praises Prof Rusu for preparing teaching experiments using ordinary things which anyone can find.)

There were also some interesting remarks. The broadening experience of ISYA was expressed in terms of: 'the school put me in contact for the first time with research-oriented people'; '…a closer look at the real world of science'; 'Mr Guinan's course determined me to make extrasolar planets the topic of my diploma paper'. For another student also, Guinan's lectures led to his BSc thesis. After ISYA, Guinan wrote a letter of recommendation for a student to participate at an Erice winter school, where she met her current German thesis advisor (Biermann). She wrote: ISYA 'completely shaped my life'. ISYA was 'the first time I heard about the dynamo mechanism in stars, now I have a paper on the large scale magnetic fields in the galaxy'. Gerbaldi's spectroscopy course ultimately led to a student's working in nuclear spectroscopy. And it was the practical activities (including those that summer organized by Prof Rusu) which led this student to decide to do some experimental physics. One student wrote that 'the Eclipse was the main event' as the experimental light curve figured in her Diploma thesis. There were numerous comments similar to 'ISYA is an important experience in my scientific life'; 'will never forget the eclipse'.

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DEVELOPING ASTRONOMY IN DEVELOPING COUNTRIES

THE PRESENT STAGE

For decades the IAU has devoted efforts helping to develop astronomy in countries or regions were this discipline does not exist or is incipient. Among the goals in mind while organizing the strategy and activities are

a) to contribute to the creation of a professional local working group
b) to provide astronomical equipment for training of students.
c) to promote astronomical observations by local people in collaboration with professional groups
d) to update the astronomical knowledge of local science teachers, hence to contribute to the education of the local young generations.
d) to popularise astronomy among the general public.

It has been mainly through Commission 46 that a large variety of activities towards the above goals have been performed, such activities include

- courses on basic astronomy for physics students, science high school teachers, public lectures
- training workshops on observational and data reduction techniques (e.g. 3 in Paraguay, 2 in Honduras, 1 in Philippines)
- loan and purchase (donation) of astronomical equipment and books (e.g. Paraguay: loan of photometer and Celestron 8, donation of books; Honduras: loan of Celestron, donation of computers, a photometer and books; Philippines: donation of books)
- financial and organizational support on local Courses or Schools, e.g. 6 in Central American countries, 4 in Paraguay, 3 in Philippines.

Other efforts in other countries like Vietnam and Morocco should be added to the list.

However, I am convinced that if a country or region establishes a local group of professional astronomers, or in other words, if we, at Commission 46, accomplish the above goal a) of building a professional group, the rest of the goals (and many more) would happen locally in a natural way: the training of future astronomers, the popularisation of astronomy; the training of the high school science teachers; the production and revision of scientific text in the educational curricula etc. These would occur without the permanent intervention of the IAU. Therefore my thesis is that, as an international astronomical society, our main interest and efforts should be focused to help the target country (or region) to establish a local group of professional astronomers working 'at home', and let them after some time perform the activities that we have been doing with very low success in the long term. But please do not take me as a pessimist. I am an enthusiastic participant in the teaching programs of Commission 46. Let me explain and briefly recount my experience of the last decade or so.

SOME PROBLEMS IDENTIFIED

During the last 10 years I have taken part in the teaching and training activities organized by Commission 46, in virtually all countries in Central America, Paraguay and most recently in the Philippines. I have also witnessed courses, or their results, offered by other members of the astronomical community. I am convinced that these courses are all of very good quality. Our students learn the stuff and become very enthusiastic with the idea of continuing into astronomy. Therefore everybody seems very satisfied with our activities – the local organizers, the students, the authorities at Commission 46, and the lecturers. In the short term things seem to work fine. However I have identified some problems that, according to me, prevent our program from being a successful one in the long term. Let me list some.

Our best students are also generally charmed by astronomy, but the fact that no follow up courses nor advisors are locally available on a regular basis drive them, in the best of the cases, into a different field of physics, were they find local communities warmly offering better academic support, an scholarship, and a promising academic future. In the worse cases, these good students simply disappear into the job market.

Visiting lecturers have limited time (usually only a few weeks), hence it is not posible to offer a profound course as we do in our graduate programs. Since courses are short and scanty, they often have to be repeated year after year in a given country since the generation has changed. Thus, teaching

a few summarized introductory courses to a group of permanent beginners does not help building up a well trained generation, nor does it help to develop astronomy in that country.

Two interesting alternatives were developed in Honduras and Costa Rica, two masters programs implemented locally. I think the major problem encountered in Honduras is the lack of local lecturers with the necessary training, thus the program strongly depends on the availability and good will of visiting lecturers, again with the consequence of courses being too short and too scarce. In Costa Rica the program, while solidly sustained by a professional community, is very much oriented to the theoretical physics and it is not an astronomical program in the traditional sense, lacking fundamental courses considered key courses in most astronomical masters or PhD programs.

My conclusion is that we are failing in capturing and educating good potential astronomers, and so we are failing to bring solid astronomy to a country and help astronomy to root and grow there. Thus we should change our strategy.

THE ALTERNATIVE PROCESS

We should contribute to the creation of small but solid groups of professional astronomers doing research, teaching and popularisation of astronomy in the selected country or region. Good students from developing countries need to be helped to enter into a solid graduate program in a foreign country. Potential candidates have been identified but failed to enrol due to lack of money. Usually scholarships are not available for science students in developing countries, and host graduate programs normally do not support foreign students unless there are signed agreements. Thus for students in most developing countries is very difficult to enter a good masters' or PhD program abroad.

I suggest we at the Commission 46 change our strategy to the process outlined below.

1 Use the already existing activities (TAD, CURCAA, observing workshops, etc) to select a good candidate student. This can be done by the visiting lecturers and the National Liaison. Due to the lack of funds this process would have to be done in a few countries or regions.
2 Help and orient the student to find acceptance in a well established graduate program in the region. The National Liaison and visiting lecturers' recommendations will do the job.
3 Budget IAU money to cover the student subsistence in the new locality for 1 (or 2) year(s). Usually this is the critical period to find financial support. After that, if the student does well, he/she generally finds local help in the host graduate program to continue.
4 The National Liaison must find some money for the student (e.g. to complement the local expenses and/or to pay for the student travel to the graduate program country). Examples of initial financial help from IAU and later from the local graduate program are two cases of students from Panama and Guatemala, presently getting their MSc in Mexico.
5 Promote, with the help of the National Liaison, agreements between the local university and the IAU to create a job position for the new astronomer.

The National Liaison usually knows the local 'handles' to get money, and the political will in government science funding boards or universities. With the backing of the IAU and adequate political manoeuvring, things can be achieved.

TWO POSSIBLE DRAWBACKS OF THE SCHEME

First there is the time scale. The required time by the above process to build a small local group (2-4 astronomers with a PhD) in the developing country is of the order of 10 years, but after this initial period the growing is faster due to initatives of the local astronomers, those from the first generation.

Ten years may seem too long a period to wait, however it is very short in the time scale of the scientific development of a country. As examples, Mexico and India developed their astronomical communities in about 30 years by a process very similar to the one described above.

The other question triggered by the above scheme is, how to assure that the student, with a PhD, is interested in returning home to practice and serve as a fundamental link for the next generation? While indeed this is beyond our control, the IAU can promote the signature of agreements between the local universities and the students conditioning the financial support. On the other hand the student can be encouraged to return home if a good job, like a position in the University, and a reasonable salary

are offered. In achieving these initiatives, the role played by the National Liaison would be crucial, and lots of lobbying is to be performed by us the lecturers.

CONCLUSIONS

- IAU Commission 46 activities in the developing countries are generally successful in driving young people into astronomy, but not permanently, … *we are hooking out the fish but then loosing it back into the water!*
- Thus we are ***not*** helping to create local astronomical communities. Hence astronomy research and astronomy education in developing countries will continue to depend on the astronomically developed. Our investment in the form of money, time, and effort will go wasted as not a truly mature and independent astronomical group is the result of our many activities, despite their sincerity and high quality of them.
- IAU efforts should be focused on specific countries or regions, but should be more acute both politically and financially for a longer term (e.g. 5 years). **The present strategy of Commission 46 towards helping the developing countries to grow astronomically should, in my opinion, be changed.**

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CARINA REACHES FOR THE SKY IN TRINIDAD AND TOBAGO

There has been a recent upsurge of development in astronomy in Trinidad and Tobago with the formation of Caribbean Institute of Astronomy (CARINA) in May last year. This is a non-profit educational organization that is working towards the popularization of Astronomy, not only in Trinidad and Tobago, but hopes to unite the resources in the Caribbean as a whole. Astronomy in the Caribbean is as scattered as the islands are. Barbados and Jamaica both have societies but there is little or no contact among the islands. CARINA, a three-person team, is independent of the local astronomical society of Trinidad and Tobago. Mr Graham Rostant is the President, Dr Shirin Haque, the Executive Director, and M. Jourdain Cornwall is Secretary/ Treasurer.

Within the last year, CARINA has established a memorandum of understanding for cooperation in outreach activities with the National Science Center of Trinidad and Tobago, which is the only one in the Caribbean. CARINA was the recipient of an award of appreciation from NIHERST (National Institute of Higher Education, Research, Science and Technology) for their promotion of astronomy, at their annual awards ceremony. The National Science Center has obtained a 12 inch Meade telescope, and CARINA ran workshops for its staff in its training and use. The Science Center now holds observing sessions for the public twice a month. The first ever Astrocamp was also held two years ago, for children aged 10-16. The interest and response has been very good from the public.

CARINA has also taught courses for high school students in astronomy in several schools. They are working on implementing a Caribbean version of Project ASTRO.

In March, the first ever star party in Trinidad was held in conjunction with the National Science Center. Enthusiasts brought out their personal telescopes to the event that was attended by over 200 persons. There was an overwhelming public response indicative of the desire for events like this by the population. Apart from stargazing and planet hopping, presentations on topics of astronomy were also held at the star party.

When Mars made its closest approach to Earth in thousands of years in late August, there was once again quite a stir in the community, and viewing sessions were organized at the Science Center which were solidly booked over the two weeks, with over 100 persons in attendance each night.

CARINA assists in the operation of the telescope at the privately owned observatory SEAS (Sea, Earth And Sky) in Tobago as well as with SATU, the 16 inch Meade telescope at the University of the West Indies – which is a joint research project between Tuorla Observatory at the University of Turku in Finland and the University of the West Indies. It monitors BL Lac and other variable objects.

CARINA has on its team of advisors, astronomers from the USA, Canada, and Finland, as well as an educational psychologist, and a communications expert. Prof John Percy from the IAU Commission 46, is also on the board of advisors of CARINA.

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LATIN-AMERICAN JOURNAL OF ASTRONOMY EDUCATION

We are pleased to inform you all, particularly those interested in the teaching, history and popularization of astronomy, the launch of the Latin-American Journal of Astronomy Education (RELEA). It will an indexed on-line journal, and the articles will be refereed following the procedure known as double-blind peer review. The first edition will be released near the end of this year.

The main objectives of the RELEA are

- to fill the absence of a specific publication of astronomy education in Latin-America
- to be a forum to show Latin-American activity in this area
- to serve educators, researchers and astronomy students, in all levels of education, and to provide them methodological and content tools
- to promote the development of research in astronomy education in Latin-American countries.

RELEA is composed of the following Sections.

- Culture, History and Society
- Teacher Formation
- Teaching and Learning
- Didactic Resources
- Educational Policies
- News
- Reviews
- Events.

We are doing the first call for papers, which can be written in Portuguese, Spanish or English. Those interested in submitting work will find more information about the RELEA and instructions to the authors at
www.iscafaculdades.com.br/relea or http://www.iscafaculdades.com.br/relea/english/index.htm

We ask your collaboration in spreading the news of the launch of this journal, and we invite you to send us your papers on that field. We thank you for your attention.

Paulo Sérgio Bretones, Luiz Carlos Jafelice, Jorge Horvath
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ASTRONOMY EDUCATION REVIEW

We are pleased to announce the completion of the first issue of the second volume of Astronomy Education Review, the web-based journal/magazine for all those in our field engaged in education and outreach. (http://aer.noao.edu).

The table of contents for this issue is below. On the website you will see the second issue of the second volume already under way. The first issue of Volume 2 is now under back issues.

Regular readers of the journal are being encouraged to become charter subscribers (at no cost) – they can be notified when new issues come out. See the site for details. The editors (Sidney Wolff and Andrew Fraknoi) continue to solicit papers, articles, opinion pieces, and news items for the journal, which now receives over 100 000 hits each month. A new letters to the editor section is now in the planning stages.

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ESA/ESO CD-ROM AND WEBSITE

The European Space Agency and the European Southern Observatory have issued a CD-ROM Astronomy Exercise Series, using real HST and VLT data, intended for advanced high school students. They are in seven languages: Dutch, English, French, German, Italian, Spanish, Swedish. The exercises can also be found at http://www.astroex.org/

Barrie W Jones
(for contact details see Officers & Organizing Committee of Commission 46)

RESOURCE GUIDE FOR INTRODUCTORY COLLEGE ASTRONOMY

A new annotated guide to web sites for teaching Astronomy 101 at the college or advanced high school level is now available on the education web pages of the non-profit Astronomical Society of the Pacific.

The guide currently lists and explains 78 sites, divided into 10 categories, ranging from organizations that offer teaching resources to relevant web-based applets and shareware. Also included is a list of the web sites for astronomy textbooks, a guide to exciting classroom demonstrations and activities, and links for interdisciplinary approaches to the introductory course.

The site is available at: http://www.astrosociety.org/education/resources/educsites.html The site is NOT a guide to astronomical subject matter. Instead of focusing on WHAT to teach, it provides resources on HOW to teach basic astronomy more effectively.

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NEWS OF MEETINGS

EDUCATION SESSION AT THE UK NATIONAL ASTRONOMY MEETING, APRIL 2003

The aim of the Education session at NAM 2003 was to highlight some interesting new resources and opportunities available for teachers of astronomy. Although the session was well attended, not many of those present were school teachers, in spite of the meeting being in term time, with free registration for teachers.

Virtual Observatory

The first speaker was Dr Nicholas Walton (Institute of Astronomy, Cambridge) who spoke about the Virtual Observatory, a project still on the horizon but which has massive potential as a resource not only for researchers but also for all levels of education. The concept behind the Virtual Observatory is to make available the data collected by modern ground-based or space observatories at all wavelengths from X-ray to radio, for others to use.

Data taken in recent years has all been in digital form and huge independent databases exist. The scientists who made the observations have analysed the results for their own research but another project could use the same observation for a completely different purpose. A simple example may be that when a supernova is discovered in a distant galaxy it is interesting to find out what is known about the progenitor star before it erupted. Observations of that galaxy may have been made in the past. The task of the Virtual Observatory is to use the latest technologies in information management to develop the software tools for astronomers to access, select and analyse hundreds of gigabytes of data on a remote computer and to see the results without transferring the data to one's own computer.

Dr Walton is Project Scientist for AstroGrid, the UK's contribution to the Virtual Observatory. AstroGrid is one of the first of the UK's e-Science projects and its priority is to develop a virtual observatory capability for astronomical data of importance to the UK community. This will include data from Jodrell Bank, La Palma, Hawaii and Chile as well as space projects such as SOHO and Cluster. There are seven UK institutions involved in the Astrogrid consortium, which is in turn a member of Europe's Astrophysical Virtual Observatory (AVO) Project. The AVO partners held a meeting in January at Jodrell Bank Observatory at which a prototype of the software was presented. The AVO partners are also members of the International Virtual Observatory Alliance (IVOA) which consists of 12 consortia from around the world including the United States and the Asia-Pacific Region who are working together to define global data standards. Astrogrid is a 3-year project which officially started in September 2001. The IVOA aims to be fully operational by 2007.

For more information see the AstroGrid website http://www.astrogrid.org

The Suntrek project

Dr Helen Mason (Cambridge University) then spoke about the Suntrek project. Suntrek is a programme of promotional and educational materials about the Sun and its effect on the Earth's environment. The UK has a very strong research community in these scientific areas. The project aims to provide accessible explanations of the latest research, including recent data highlights, and to provide educational resources linking these science areas with the curriculum. Some of the material used in Suntrek is based on the successful web site called SunBlock99, which was produced for the 1999 total solar eclipse and uses the presentation of young solar researchers to promote the science.

The software company, Interactive Media Design Consultants, has worked closely with the project team: Dr Dave Pike (Rutherford Appleton Laboratory), Dr Helen Mason (Cambridge University), Dr Robert Walsh (University of Central Lancashire), and Dr Rosalind Mist (ECSITE UK). The Suntrek website is launched in autumn 2003. The style and presentation of the material is unique. The main aim has been to make the site interesting and fun, as well as being educational. Particular attention has been paid to areas of direct interest in the classroom, such as the Earth and Beyond, Satellites and Energy Resources. Care has been taken to ensure that the presentation and content are appropriate for the target age range (11-15 years). Suntrek also contains material of interest to the general public.

For more information contact Helen Mason, H.E.Mason@damtp.cam.ac.uk

Public Astronomy on a Heritage Site

Dr Robert Massey (Royal Observatory, Greenwich) gave a talk entitled Public Astronomy on a Heritage Site: Antique Telescopes and Online Education. He described the educational activities at the Observatory, including a schools programme of workshops for children of all ages from the start of primary school (elementary school) to post-16. There are also Short Courses for the whole family, suitable for age 8+, normally held on successive Sundays, and one-day conferences on selected topics such as a forthcoming one on Extraterrestrial life. Students can also study for GCSE astronomy (taken at 16 in schools) in a programme run in conjunction with Goldsmith's College, University of London.

For more details see the ROG website at http://www.rog.nmm.ac.uk/

Armagh Planetarium

The meeting then heard about developments at the Armagh Planetarium from Dr Tom Mason (Armagh Planetarium). Three years ago the Star Theatre, the heart of the Planetarium operation with its landmark dome, was shut down for health and safety reasons. Since then the Planetarium staff have concentrated on outreach activities with local schools and community groups. Summer openings at the Planetarium have targeted families and they have used an inflatable Stardome with a portable projector to good effect for audiences of all ages.

They are collaborating with the European Space Agency to bring new displays to the Planetarium for summer 2003, and are piloting a satellite observation programme called EDUSPACE. We also run an after school network of Astrogazers Clubs in around 20 post-primary schools. The primary schools programme encompasses astronomy and related sciences, including Electricity and Magnetism, Space Art, Dinosaurs and Asteroid Impacts. Our activities include summer school work and year round involvement in science education with Special Needs schools.

A sum of around £8.4 million is needed to bring the site into the 21st century. They are currently working with the funding agency, the Department of Culture, Arts and Leisure to raise this money and a public private partnership is currently seen as the best way to go forward

So despite the body blow of the loss of the Star Theatre, the Planetarium has developed a successful outreach programme, and schools are now returning to the Planetarium for a stimulating visit that does not include sitting through an automatic Star Show. They have demonstrated that people enjoy live interaction with good presenters that provides scientific information in an exciting environment.

Tom Mason may be contacted by email at trm@planet.armagh-planetarium.co.uk

Space Science News

Billy McClune described a project undertaken by himself and Dr Ruth Jarman (Graduate School of Education, Queen's University Belfast) entitled Space Science News – the Secret Life of Newspapers.

How can newspapers be used to support space science education in schools? The presentation illustrated how authentic newspaper articles can be used in the science classroom to enrich a number of aspects of the secondary school curriculum. The session highlighted Space Science News, a special edition newspaper supplement, produced by teachers in Northern Ireland. The group received a PPARC grant, and worked closely with Northern Ireland's regional newspaper the Belfast Telegraph.

In science, as in other subjects, teachers are being encouraged to explore a range of additional resources of which newspapers are an important element. Lift any newspaper and you are almost sure to come across science-related stories. Appropriate articles do not appear to order, however, and relevant news does not break conveniently just as you are about to teach a topic. Furthermore, once suitable stories have been found it takes time to design interesting and effective activities around the report.

The group of teachers working with Billy McClune and Ruth Jarman, has developed a novel science resource which addresses these issues. This publication is in newspaper format and comprises a selected set of authentic articles on astronomy which have appeared in the Belfast Telegraph over recent years. Associated with the articles are classroom activities which teachers can use to help catch the interest and imagination of their pupils as they read the news stories and learn about the related science. The 20-page colour issue addresses topics including the Moon, lunar and solar eclipses, meteors, asteroids and comets, radio astronomy, living in space, and includes a number of specially commissioned feature articles.

The newspaper was launched in February and is currently available, free on request, to post-primary schools in Northern Ireland.

For information contact Billy McClune w.mcclune@qub.ac.uk

The Joint Information Systems Committee (JISC)

Dr Gillian Sinclair spoke about The Joint Information Systems Committee (JISC), an independent advisory body that supports further and higher education by providing strategic guidance, advice and opportunities to use Information and Communications Technology (ICT) to support teaching, learning, research and administration. JISC is funded by all the UK post-16 and higher education funding councils.

The huge growth in the availability of resources can make the business of finding the ones suited to your needs both time consuming and frustrating. To make life easier, the JISC Resource Guides will direct staff and students to a selection of key, high quality resources in seven subject areas.

Of particular interest to the physics and astronomy community is the Resource Guide for Physical Sciences which covers astronomy, physics, chemistry, Earth and material science. The resource guides are free to all UK higher education institutes, and are available to order online at http://www.jisc.ac.uk/resourceguides where an online version of the guide is also available. Each guide is available in both print and web format.

Resource Guide Advisers offer a programme of free outreach activities in response to your subject needs, including hands-on workshops and training events. Training can be tailored for any audience including academics, researchers, post-graduate students and subject specialist librarians. Each Guide is compiled in consultation with subject-based advisory groups comprising librarians, academics and other relevant parties such as learned societies. Resources considered for inclusion include those from partner organisations, such as the Learning and Teaching Support Network (LTSN) and the Research Councils.

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EFFECTIVE LEARNING & TEACHING OF ASTRONOMY, JULY 2003

At the 2003 IAU General Assembly in Sydney, Australia, Commission 46 sponsored a 1.5-day Special Session Effective Teaching and Learning of Astronomy. The emphasis was on elementary and secondary school astronomy; that is where most people are taught astronomy, and that is where teachers are most in need of information about astronomy content and teaching. The emphasis was also on techniques, programs, and projects which could be shown to be effective – by research, assessment, or experience.

Over one hundred astronomers and astronomy educators took part in the session. Several dozen posters were contributed, and these were on display for the week of the session. The session included brief oral presentations of poster highlights on education research, teacher education, and curriculum and resources.

Commission 46 President Syuzo Isobe (Japan) opened the session by reviewing the education activities of our commission, and expressing the hope that it will become more active in promoting more and better astronomy in the schools. John Percy (Canada), chair of the Organizing Committee of the session, listed the many reasons why astronomy is useful, and should be part of the school curriculum; he also pointed out that the curriculum is more than just 'knowledge'; it includes skills, applications, and attitudes. Following an open discussion of the many ways that astronomy can be included in the school science curriculum, Rosa Maria Ros (Spain) emphasized the value and importance of including astronomy in the *mathematics* curriculum: it provides motivation, interest, and real-world examples for this potentially-dry subject.

Three presentations discussed astronomy education research: an introduction to education research in astronomy and science in general – especially 'down under' – by John Broadfoot and Ian Ginns (Australia), a review of astronomy education research by Janelle Bailey (USA), and an inspiring

account, by Leonarda Fucili (Italy), of how she applies her own astronomy education research, and that of others, to her work as a teacher educator and as a classroom teacher. This was followed by a review, by David McKinnon (Australia) of distance and Internet education in astronomy in the schools, illustrated by two examples: a system of robotic telescopes which is used by schools in Australia and elsewhere, and the Cosmology Distinction Enrichment Course for gifted high school students in Australia. Rob Hollow (Australia) provided more information about the latter project, and about the general role that astronomy can play in enriching the education of talented and gifted students. There were brief presentations on several other robotic or remote telescope projects intended for schools.

Very few schoolteachers have any background in astronomy and astronomy education. Mary Kay Hemenway (USA) reviewed issues related to pre-service teacher education in astronomy, and Michele Gerbaldi (France) shared her experience with in-service teacher education in astronomy, especially through France's Teachers-Astronomers Joint Committee – CLEA. On the subject of resources for teachers, Jay Pasachoff (USA) reviewed the role of textbooks in school-level astronomy, including his own experience in co-authoring several textbooks at that level. Sidney Wolff (USA) described the on-line Astronomy Education Review – the first journal devoted exclusively to astronomy education research and information.

The needs of the astronomically-developing countries were not overlooked. Jayant Narlikar (India) discussed the problems of pseudoscience, and the need to promote rational thinking; although his examples were taken from his own country, most of them were equally true of North America. Julieta Fierro (Mexico) described the advantages of using cultural examples and applications of astronomy – past and present – in teaching astronomy in countries such as her own. Case Rijsdijk (South Africa) shared his thoughts and experience in developing and implementing a curriculum including astronomy in a country with limited human and financial resources for science education. Jay White (USA) discussed the specific issue of astronomy textbooks and resources for astronomically-developing countries, with specific reference to Vietnam, where the Commission 46 program Teaching for Astronomical Development has been active.

Astronomy education takes place outside of school as well as within; this is often called public or informal astronomy education and outreach. Nahide Craig (USA) discussed what makes a public education program successful, and how one can assess and measure success. Nick Lomb (Australia) discussed the role of public observatories; he is the curator of the Sydney Observatory, a facility that many session participants had the pleasure of visiting. Finally, Claus Madsen (Germany) described some of the innovative outreach projects which European astronomers are carrying out, through various organizations and networks.

At this General Assembly, Commission 46 proposed a Resolution (see above) which stressed the importance of introducing more and better astronomy in the school curriculum world-wide, and more and better training and support for teachers. (This Resolution was unanimously passed, as proposed, by the General Assembly, though not without some unexpected 'wordsmithing' by the audience!)

The final part of the session was an open discussion on how astronomers could help to implement this Resolution in countries around the world.

A 'short' proceedings of the session will be published in the IAU Highlights series. A full proceedings is to be published by Cambridge University Press, with Jay Pasachoff and John Percy as co-editors.

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COMMISSION 46 BUSINESS MEETING, JULY 2003

Commission 46 business meetings were held during the IAU General Assembly in Sydney, on 18 and 22 July. The minutes can be found at the Commission 46 website
http://physics.open.ac.uk/IAU46
under Minutes of Business Meetings.

Here are some photographs taken at the meetings.

Barrie W Jones
(for contact details see Officers & Organizing Committee of Commission 46)

ASTRONOMY EDUCATION IN EUROPE, AUGUST 2003

At this meeting the European Astronomical Society aimed to contribute to and promote the advancement of astronomy, in its broadest sense, in Europe, by all suitable means and in particular by providing

a) an independent forum for the discussion of subjects of common interest
b) means whereby action can be taken on those matters which appear desirable to be handled at the European level.

One of the subjects of common interest is astronomy education. More and more it becomes a problem in the world, taking into account its absence in most of the curricula of different countries, an unprecedented proliferation of astrology and other pseudo-sciences, and the stronger role of the mass media and internet in spreading scientific information. All these determined the IAU to adopt during its last General Assembly at Sydney a special Resolution, and the EAS to organize for the first time a Special Session on the same topic during JENAM 2003 (Budapest, August 26). It was opened by Prof Syuzo Isobe, the former chair of IAU Commission 46. Many communications (oral or posters) from Bulgaria, Germany, Greece, Hungary, Romania, Russia, Spain, and from Japan and USA too, were presented. They concern the education at different levels in the primary schools, secondary schools, and universities, as well as the role of the planetariums and mass media for astronomy education. The Proceedings are published by the kind support of Prof Syuzo Isobe.

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COMMUNICATING ASTRONOMY TO THE PUBLIC, OCTOBER 2003

On 1-3 October 2003, more than 130 individuals gathered in Washington, DC, for the Conference on Communicating Astronomy to the Public (CCAP).

This meeting, which was sponsored by the National Radio Astronomy Observatory in cooperation with the National Research Council, was an effort to bring together professionals from the astronomical community who perform a wide range of education and public outreach (EPO) duties. Among those represented were observatory public information officers and other staff, representatives from planetariums and science centers, research scientists engaged in public outreach, and association and educational organizations that have an interested in this activity. Funding for the conference was provided by the US National Science Foundation.

The meeting featured morning panel sessions on salient issues in astronomy EPO. Topics covered included: Entertainment and Hype in Outreach; Astrophysics versus Astro-graphics (or how to graphically represent astronomical data); Needs of Under-served Outreach Avenues (what small planetariums, science centers, park rangers, and others need from the astronomical community); the Connection Between EPO and Research Astronomy; and Successful Practices in Communications.

Many leading national and international figures in communications presented compelling details of what the astronomical community can and should be doing to better communicate the fruits of research.

The second major component of this meeting was afternoon breakout discussion groups. Each day, conference participants joined in on one of five teams to discuss what was presented in the panels and to explore ways of addressing the needs presented.

The reports of these sessions were presented to the entire conference. At the end of the three days, several concrete proposals and action items were developed, and will be pursued by several working groups organized at that meeting. A complete description of the meeting is available on line at: www.nrao.edu/ccap. The results from the meeting will be posted on that site shortly. If you have specific questions, you may contact me.

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EDUCATION AT THE UK RAS NATIONAL ASTRONOMY MEETING, MARCH 2004

Next year's Royal Astronomical Society National Astronomy Meeting in the UK will be held at the Open University, Milton Keynes, from Monday 29 March to Friday 2 April. On the Monday, 1100-1230, there will be a session on astronomy education, to be organized by Paul Roche of Cardiff University. Further information will be at http://physics.open.ac.uk/NAM/ in November.

The Open University is where I work, and in fact I am Co-Chair of the Organising Committee of the whole of RAS-NAM04.

Barrie W Jones
(for contact details see Officers & Organizing Committee of Commission 46)

TEACHING INTRODUCTORY ASTRONOMY, JULY 2004

This is a symposium on teaching introductory astronomy for non-science majors, to be held at Tufts University, near Boston, USA, 17-19 July 2004. To be on the mailing list for future announcements, or to make suggestions for the program, email the Chair of the Program Organising Committee, Andrew Fraknoi, at fraknoiandrew@fhda.edu

Updates on the meeting are at http://www.astrosociety.org/events/cosmos.html

William Waller of Tufts University chairs the Local Organising Committee, and will be happy to hear from volunteers in the New England area who want to help – wwaller@mos.org

Barrie W Jones
(for contact details see Officers & Organizing Committee of Commission 46)

INFORMATION ON THE IAU C46 WEBSITE

The IAU C46 website **http://physics.open.ac.uk/IAU46** contains the following information.

- Commission 46 Terms of Reference, Rules & Guidelines
- Minutes of the most recent Business Meetings
- List of National Liaisons
- Offices, Organizing Committee & Program Groups
- Online Newsletters
- Presidents and Vice-presidents
- Resolution on the value of astronomy education (passed by the IAU General Assembly 2003)
- External links
- Announcements/news

Shortly the website will also be found at http://astronomyeducation.org

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Organizing Committee (OC)

The officers 2003-2006 are: the President, the Vice-president, the Retiring President, and three former Presidents in active liaison – Julieta Fierro, Derek McNally, and John Percy. For details of the OC, and for the other members of the Program Groups, see the website below, at the minutes of the Business Meetings held in Sydney, Australia, in July 2003.

National Liaisons

These are listed on the website **http://physics.open.ac.uk/IAU46**