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

Newsletter 69 – October 2008

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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CONTENTS

EDITORIAL

Thanks to everyone who has made a contribution to this edition of the Newsletter. For the March 2009 issue the copy date is **Friday 13 March 2009** (we are astronomers, not astrologers!). If you can include photos or illustrations with any material, please do so. Feel free to encourage others to submit material – anything with an astronomy education or development aspect will be considered.

IAU C46 NEWSLETTER – GUIDANCE FOR CONTRIBUTORS

> The editor is happy to accept articles on any aspect of astronomy education or development, including obituaries and other articles on people. 500-2000 words are the approximate upper and lower limits. Shorter contributions, up to a few hundred words, such as meeting announcements, meeting reports, and other news items, are also welcome.
>
> Send contributions to me by email, at b.w.jones@open.ac.uk. You can either send a Microsoft Word attachment (preferred) or include the text in the body of the email. Illustrations should be sent as separate, individual files, preferably as JPEGs or TIFFs up to about 2 Mbytes each.

I try to edit as lightly as possible, and I certainly don't care whether US English or British English is used. I also leave local turns of phrase untouched unless the meaning is obscure. Clarity, conciseness, and being interesting or informative are what I like. Only in rare cases is heavier editing necessary.

The C46 website

Recall that in September 2007, the C46 website was transferred to the Observatoire de Paris. The new URL is on the title page of this Newsletter – http://iau46.obspm.fr/ If you enter this website you can see that only a few back issues of this Newsletter are there. The complete set dating from shortly after I took over as editor can be found at http://physics.open.ac.uk/~bwjones/IAU46/, starting with Newsletter 50, March 1999. At the same URL I've included the National Liaison details as at mid October 2008; I've also sent this list to Paris so that the listing there can be updated.

Back issues of the C46 Newsletter

Just for the record, note that as well as the issues 50-60 of the Newsletter on my website, I also have hard copy of the first issue I edited, number 49 in October 1998, plus hard copy of some earlier ones, edited by John Percy.

A new editor?

Since I edited Newsletter 49, it has appeared in March and October each year since. The next issue, March 2009, will be number 70, and I think that the IAU General Assembly this August will be a good time for me to hand over to my successor. I will take this up with the C46 Officers and Organizing Committee.

Barrie W Jones
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MESSAGE FROM THE PRESIDENT

Like the entire astronomical community, one of the main priorities of IAU Commission 46 in the last few months has been the preparation for the International Year of Astronomy (IYA) 2009. So far 129 national nodes, 74 national websites, and various special task groups or projects have been set up.

Naturally, education has been included in all these activities. Worth mentioning are several special events which took place during the last three months.

One of the most significant was the symposium Education and Communicating Astronomy in Europe – Preparation for IYA2009, during JENAM 2008. It was organized by Commission 46 together with Commission 45. Given the importance of IYA2009, JENAM2008 was an ideal opportunity to showcase what the countries of Europe are intending to undertake for the IYA, and offered a last-minute chance for the individual countries to exchange ideas.

It was also a timely opportunity to showcase the work in astronomy and astronomy education for the media in preparation for IYA – this is also one of the key outcomes that we wish to achieve and therefore the programme included highlights to grab media attention. The main topics were: IYA2009 and the School Curriculum; The role of the Planetaria and Science Centres; Amateur Astronomers, Astronomy and Culture; IYA2009 and the Media.

A plenary lecture on IYA was delivered by Catherine Cesarsky, the president of IAU.

Two international astronomy olympiads have recently taken place

- The second international Olympiad on astronomy and astrophysics, Bandung (Indonesia), 19-28 August 2008
- The XIII International Astronomy Olympiad, Trieste (Italy), 13-21 October 2008.

Both prove that interest in astronomical education and the level of pupils' training is progressing, in spite of the fact that astronomy has been declining in schools' curricula. The reports of each group include many activities.

Magda Stavinschi
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TEACHING OF ASTRONOMY IN INDIA

India hosts over two hundred scientists who are pursuing front line research in astronomy and astrophysics in several research institutes and universities. These academic centers interact with the local universities in conducting astronomy courses by the universities, and also participate in conducting astronomy popularization programs such as workshops, lecture series, sky watch demonstrations etc.

However, reaching out to different parts of the country is a daunting task, considering the vastness of the country and the varied linguistic and socio-economic situations. There are many languages and for science popularization to be effective, it needs to be often undertaken in the local language. Moreover a majority of the population lives in widespread rural and semi-urban regions.

The positive aspect is that that an average Indian has deep rooted interest in astronomy, even though the interest in some cases is via astrology. Any major astronomical event such as eclipses has been of interest to general public. Television news channels regularly invite astronomers on their live shows or for phone-ins. The return of Sunita Williams saw full and continuous coverage before, during and after the prime time.

There are organizations like the National Council of Science Museums (NCSM), which administers 27 science centres/museums/planetaria spread all over India, and Vigyan Prasar, which undertake national level science popularization like publishing books and making documentaries. Several other state and privately funded science centres and planeteria exist which promote science at a local level. They continue to play the important roles of taking astronomy to the masses but also have specialized programmes such as short workshops for students, teachers and interested citizens.

The year 2007 was celebrated as the International Heliophysical Year (IHY). In addition to the academic goals, a host of outreach activities (such as exhibitions, making of simple hand held spectroscopes, solar radiotelescopes) related to the solar physics were carried out, in particular at solar observatories, such as Kodiakanal, Ooty, Nainital, Udaipur etc.

The UN declaration of year 2009 to be an International Year of Astronomy has given a boost to astronomy teaching/outreach activities at all levels. Professional organizations are drawing road maps for the various activities including workshops, and are taking astronomy in a big way to rural India. The web site http://www.iucaa.ernet.in/~iya09ind gives the overall picture of astronomy education and outreach and the way it is being and expected to be carried out in India.

Though it is difficult to put exact figures for the reasons mentioned above, the rise of suppliers of astronomy products (imported or locally manufactured) indicates the rise in general interest in astronomy. One now finds suppliers/agencies for most major international brands, be it simple telescopes or CCD cameras. Professional organizations receive regular requests to set up laboratory exercises at different levels of teaching, and requests to recive students into such organizations to do the exercises.

We also see a steady rise in the number of amateur clubs supported by educational and other organizations. In the last few years various non-governmental organizations have actively carried out astronomy teaching, in particular at school level. There has also been a rise in the number of popular books published.

We expect that next two years will see large public interest in astronomy and astrophysics

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ASTRONOMY FOR ABORIGINAL STUDENTS

In 2005 the Australian Bureau of Statistics noted that only 29% of Aboriginal students completed Year 12 of the Higher School Certificate (the equivalent of sixth form in the UK or the last year at school before students apply for first year university studies), compared to 65% for the broader Australian community. Out of the 9000 university science graduates in 2005 only 25 were of Aboriginal origin. This represents only 0.003% of the science students graduating with science degrees. This statistic is a disaster for science education policy for Aboriginal people in Australia.

The University of Western Sydney where I work is located in an area with a large Aboriginal community which has a high number of Aboriginal children of school age. The number of Aboriginal students studying science – and in particular physics – at the Higher School Certificate level is minimal. According to the teachers in the Western Suburbs of Sydney, 70% of Aboriginal students drop out of school before Year 10 (at the age of about 15). It is also remarkable that no Aboriginal student has passed through my first year engineering physics course in the last ten years, despite the fact that there is a large cohort of Aboriginal students in the schools around the University. The Aboriginal community feels that Aboriginal students should be encouraged to study science and engineering to enable them to participate in and enjoy the wealth of the nation just like the rest of the Australian community.

Project aims

With this in mind the author developed a series of astronomy activities in the hope of motivating Aboriginal students to take an interest in science. The project consisted of five after-school sessions (4 pm to 8 pm) carried out in the University's second semester. We also invited parents to attend and participate in one of the astronomy nights. This was an important exercise as the parents could see first hand what their children were learning and provide motivation to encourage their children to continue their education up to the Higher School Certificate level. Students not only carried out the projects at the University observatory but also in the physics laboratory in the School of Engineering. They were also given homework that they carried out in school as a follow-up with their teachers.

The aims of the project were: to improve the scientific literacy of the students by involving them in a series of astronomy activities that not only used the knowledge of Aboriginal astronomy but also of modern scientific astronomy; and to heighten their curiosity about things scientific. They looked at the night sky with the naked eye and also through the University's computerized telescopes, to learn how scientists explore natural phenomena and how they test their ideas and models through experiments and observations. This approach also showed them how two knowledge systems (modern scientific astronomy and Aboriginal astronomy) view the night sky.

Hands-on approach

We adopted a hands-on approach as the most appropriate method of teaching. This is similar to what we do with our university students studying science and astronomy. We also adopted the method of a cross-cultural knowledge theme to build on the cultural knowledge base of the students. To this end two knowledge systems and perspectives were used: the view of the night sky from an Aboriginal perspective; and the view from modern scientific astronomy.

The project envisaged that the students would learn transferable skills including mathematical skills, scientific skills (developing ideas and testing these ideas), measuring, using and manipulating scientific equipment, drawing inferences, observing the night sky with the naked eye and through telescopes, calculating, drawing graphs and using the graphs to draw inferences from the data, using art to express ideas, communicating their ideas orally, appreciating two different astronomical knowledge systems, working in groups, and learning to use the internet to get information for their projects.

The astronomy projects

The students undertook the following five projects: some aspects of the Solar System, properties of light and building a simple telescope with two lenses, making some astronomical measurements (distances to the stars), craters on the Moon, and the search for extraterrestrial life in the Universe.

For the project on the Solar System, the students were provided with information on various aspects of the Solar System, for example its origin and properties. For their experimental work they constructed a Solar System mobile based on the properties of the planets in the Solar System. They weighed themselves and then calculated their weights on the other planets, confirming what they had learnt about the properties of the different planets. They then viewed the planets through telescopes, following which they discussed how Aboriginal people view the planets and talked about stories associated with the planets from an Aboriginal perspective. For example, the planet Venus is known as Barnumbir or the Morning Star in Arnhem Land (north east Australia) and is associated with death. A discussion of the Morning Star ceremony was also used to highlight the connection between the planets or celestial bodies and their role in the social culture of the Aboriginal people.

Students making a mobile of the Solar System

In the project on the properties of light, the students learnt how the scientific model that light travels in straight lines is tested in the laboratory and how it is used in building a simple telescope resembling to the one that Galileo used to see Jupiter's satellites and the craters on the Moon. The students were amazed by the fact that two lenses put together in a tube could be used to build an instrument that not only magnifies objects but also enables them to see distant objects.

As part of observing the night sky with the naked eye (as their ancestors had done) and with telescopes, the students were shown how to locate the Southern Cross and how to find their way at night. They were informed how the four stars which had a kite like pattern were interpreted by Andreas Corsalis, a Florentine traveller who sailed with a Portuguese expedition to Goa in India in 1515, as a cross. He interpreted the pattern from the perspective of his Christian heritage. In Arnhem Land where fishing is a daily activity, the Aboriginal people see the same pattern of stars as a shark (the Pointers) chasing a stingray (the Southern Cross).

The students were asked to imagine themselves as living about 10 000 years ago. They were asked to draw the Southern Cross constellation and write and tell the story about the stars they had drawn. Apart from the scientific skill of observing nature, this exercise also developed in them artistic and communication skills.

The Southern Cross as seen by Aboriginal people in Arnhem Land

Project three involved students in making scientific measurements and learning how to use the telescope and the planisphere to find the location of stars. As an exercise in the physics laboratory they found out how to measure the distance to a star. The aim of this project was to show the scientific process in action.

The fourth project dealt with craters on the Moon and how they were formed. A discussion on asteroids and their impact on life on Earth generated a lot of interest. The students did an experiment in the lab with a sand tray to represent the surface of the Moon. They dropped various sized steel balls from different heights and measured the diameters of the resulting craters. They then drew graphs and extracted information and made inferences from them. This part of the project concluded by talking and discussing how the Moon was formed from a scientific point of view, how the Aboriginal people thought the Moon was formed, and how they explained the phases of the Moon. We also discussed Aboriginal stories about the Moon in the context of their social culture. They found this experiment to be one of the most interesting ones that they carried out as it gave them sufficient leeway to change the parameters of the experiment. The teachers were also pleased with the experiment as it allowed the

students to see how a graph from a physical experiment they had done themselves was used to draw inferences.

The final project focused on the search for extraterrestrial life in the Universe. The optical SETI project being conducted by the author was discussed with the students. They were asked to design a message to ET, taking into consideration some of the following questions: should the message be mathematical? should it be a drawing? should it have chemical symbols? should it be in binary numbers? After having completed their designs the students were asked to tell the class about their design and defend it. They found this exercise very stimulating as it allowed them to use their creativity.

Outcomes

The overall outcome of the project was positive in changing Aboriginal students' attitudes to science and its processes. They found the experiments they conducted at the University interesting and said that they would like similar experiments to be done at school. Most of the students found school science boring. All the students found astronomy interesting but they found looking through the telescope an exciting activity. A greater percentage (67%) of the students would like to continue their studies up to the Higher School Certificate level after participating in this project than beforehand (20%). Students found out about both Aboriginal astronomy and modern scientific astronomy, and were able to appreciate that there were two world views of the universe: a socio-cultural and a scientific.

Part of the project was shown on National TV news as an item of significance in Aboriginal science education in Australia. The project is continuing with a group of new Aboriginal students.

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DEVELOPMENT OF ASTRONOMY IN MOZAMBIQUE

Introduction

In early June 2008 I visited Mozambique as a representative of IAU Commission 46 Programme Group for the World-Wide Development of Astronomy. The visit was conducted at the invitation of colleagues in Mozambique who are interested to develop astronomy in their country. The purpose of my visit was to assess the current situation in Mozambique with regard to teaching and research in astronomy, to identify the key actors and to assess the levels of institutional and government support for the establishment of astronomical activities in that country.

Astronomical activities in Mozambique in the 20th century

Modern institutional astronomy in Mozambique dates back to the early 1900s with the establishment of the Observatorio Campos Rodrigues (OCR), established in 1908 to observe star positions and to supply time signals. The observatory was equipped with a Bamberg transit circle telescope. This was one of a number of astronomical observatories established throughout the former Portuguese colonies to support maritime navigation. The OCR later started to perform meteorological observations and in time became the home of the Meteorological Service of Mozambique. The observatory also performed seismic observations and magnetic observations at a network of stations established throughout the country at various times during the 20th century.

In 1989 the Instituto Nacional de Meteorologia (INAM) was established out of the Meteorological Service. The redefined institution faced severe funding challenges to meet its mission and the Director at the time, Sergio de Sousa Ferreira, decided that INAM should concentrate on its core function as a

meteorological institute and that activities such as astronomy, seismology and geomagnetism should reside under other institutions. The seismology and geomagnetism functions were transferred to the Ministry of Natural Resources and the astronomy functions were transferred to the University Eduardo Mondlane.

Today, the University of Eduardo Mondlane (UEM) is the principal institution driving the development of astronomy in the country. The university has a small observatory on the roof of the mathematics building, which houses a Soviet-built satellite tracking telescope. Apart from routine satellite tracking observations, no astronomical observations were conducted form the university. In the mid-1990s this programme was terminated. For the decade that followed there was no significant astronomy activity at the University. Then, in 2005, some junior academics at the university started to develop links with astronomers in South Africa and became involved in the regional bid to host the Square Kilometre Array telescope. This visit arose out of those links.

The original, early 20th century building of the Observatorio Campos Rodrigues, now part of the National Institute of Meteorology (INAM). My hosts Faustino Nhanombe and Claudio Moises Paulo stand in the foreground.

Observations & Recommendations

There is a strong interest in the Physics Department at the UEM in developing astronomy with the assistance of colleagues in South Africa and the IAU. The Department has commenced an initiative to introduce astronomy as part of its undergraduate curriculum. The person who is spearheading this initiative is Mr Claudio Moises Paulo, a junior lecturer in the Department. Mr Paulo enjoys the full support of the academic hierarchy for the introduction of an astronomy programme in the Physics Department. For this reason, he was granted leave of absence for several years to complete a Masters degree in astronomy in South Africa.

The University is supported by the National Institute of Meteorology (INAM), with which it has close links. INAM has also released one of its scientists, Mr Faustino Nhanombe to complete a Masters degree in astronomy in South Africa under the aegis of the regional SKA bid programme. Mr Nhanombe completed his studies in May 2008 and has subsequently resumed his position at INAM.

At Government level, the Ministry of Science and Technology is supportive of the development of astronomy and space science activities in the country, and is looking to the University to take the lead in developing institutional capacity in this area. The Government is also keen to promote activities in the framework of the International Year of Astronomy 2009.

Clearly, astronomy in Mozambique is in a nascent phase, and must be carefully nurtured if it is to flourish in the coming years. At this stage, small but significant steps may be taken by the IAU to support this objective.

I recommend that:

1. The IAU should recognise and nurture the current initiatives to develop astronomy in Mozambique. These are initiatives by Mozambican scientists who seek guidance and advice from their international colleagues. A step in this direction would be to identify a suitable local contact person for IAU Commission 46 Teaching and Development of Astronomy.
2. A small, modern telescope at the University would provide an extremely powerful platform for public outreach and undergraduate training in astronomy, and could be the hub around which an undergraduate practical observing programme is built. Consideration should be given to possible forms of assistance or facilitation, which Commission 46 might be able to provide to enable the acquisition of a 20-30 cm computerised telescope with accessories.
3. The IAU could assist colleagues in Mozambique to develop a DIMM system for site testing. The assistance could take the form of guidance and advice, as well as collaborating on the drafting of funding proposals to organisations such as the Third World Academy of Sciences.
4. The IAU could consider supporting participation by a Mozambican scientist at the next IAU General Assembly in Rio de Janeiro Brazil in 2009. This might be arranged as part of an activity at the Assembly organised by Commission 46, where they could present a talk or poster on astronomy activities in Mozambique. Another possibility would be to invite Mozambican participation in the next Middle East Africa Regional IAU Meeting.
5. Commission 46 should consider supporting visits by professional astronomers to teach short astronomy courses at UEM. This is one of the areas where young astronomers at the last IAU GA indicated a willingness to help their colleagues in developing nations. If resources could be mobilised to allow such visits for 1-3 months, this would have a huge impact on the development of astronomy in the Department.

The flowering of Mozambican astronomy will take at least 10 years, when the present generation of students, inspired by the new curriculum at the University, decides to study astronomy at postgraduate level. Initially, such studies will take place in other countries, and it will be important to develop opportunities *in Mozambique* for these young scientists to return to after graduation. The increasing penetration of the internet in Africa has greatly reduced the isolation of scientists over the past 10 years. The challenge for the future is to take advantage of the opportunities being created by the presence of new large-scale facilities on the continent, such as the Southern African Large Telescope or the High Energy Stereoscopic Facility in Namibia, to create an indigenous community of African astronomers.

Acknowledgements

I acknowledge the gracious hospitality of my hosts at the University Eduardo Mondlane. I am grateful to Mr Claudio Moises Paulo (UEM) and Mr Faustino Nhanombe (INAM) for making the local arrangements for my visit. I am also grateful to the International Astronomical Union for financial support that enabled me to visit Mozambique, and to Prof John Hearnshaw, Chair of the Programme Group for the World-Wide Development of Astronomy, for his support and for kindly allowing me to use his IAU presentation.

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A NOVEL USE OF THE SIMPLE PENDULUM

Introduction

In a typical class of geography, in a secondary school, the spherical nature of the Earth is usually supported by the observation of a ship approaching the port or moving away from it. In addition, nowadays, photos of Earth taken with the help of a satellite, are also used as a proof of Earth's shape.

Although both of these pieces of evidence have been used for many years, all over the world, there are certain inadequacies which came to the fore recently. First, it is not always possible to take students to a port for the observation of a ship. Second, photos are not the most convincing proof because the tricks in photography are well known to children. Therefore I have used the simple pendulum for a couple of years to bring home the point that the Earth is spherical. This activity is an easy one because students of geography have to learn physics also, and perform the experiment of determining the numerical value of the acceleration due to the gravity. After that experiment, the following activity can be added bringing physics and geography together.

Theory

In this experiment, one has to vary the length of a pendulum and measure effect of the said variation on the period of oscillation. One can observe that the square of the period of oscillation is proportional to the length of the pendulum. The graph of T^2 versus the length of the pendulum is a straight line, and it is possible to calculate the numerical value of the acceleration due to gravity. Also, it is possible to calculate the length of a seconds pendulum, which is of interest for the additional geographical activity. (Ed. A seconds pendulum is one with a period of exactly *two* seconds.)

The spherical nature of Earth

The acceleration due to gravity, g, is also the strength of the gravitational field, and the following equation relates it to the gravitational constant G, the mass of Earth M, and its radius R

$$g = GM/R^2$$

Students from various member countries of the IAU – like India, the UK and Australia – can perform the pendulum experiment, share results and realize that the length of a seconds pendulum is the same everywhere, regardless of their country. This is because the Earth has only one length-like quantity, namely, its radius. At this point, a teacher can open the discussion as follows. If the Earth is like a plane, it will have length and breadth. But the above equation shows that the mass of the Earth, M, the gravitational constant (whose numerical value was first determined by Henry Cavendish) and the acceleration due to gravity, g, is related to only one length-like quantity of the Earth. G, M and g are constants and therefore R also has to be a constant. Consequently, the shape of the Earth is spherical.

Involvement of parents

A simple pendulum can easily be set up at home, so I encourage students to do the experiment at home also. Therefore, parents usually watch the son/daughter enthusiastically doing the experiment and explaining various aspects of it. This would be a good activity for the IYA events next year.

Caution

In reality, the Earth is not an exact sphere e.g. its equatorial radius is greater than its polar radius. But this is not significant, as far as teaching in a high school is concerned, and so can be ignored.

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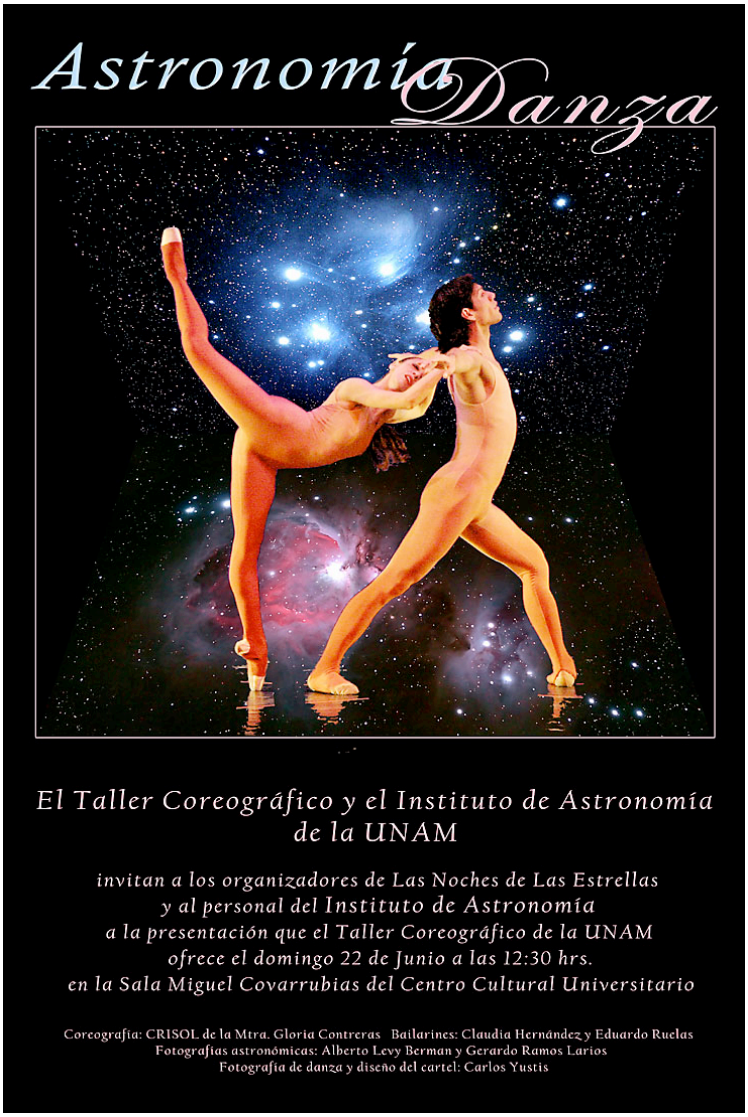
A BALLET TO HONOUR GALILEO

Mexico's National University (UNAM), not only houses the Astronomy Institute (Instituto de Astronomia) where we work, it also has a wide variety of cultural activities including a ballet company. The Taller Coreográfico is directed by Gloria Contreras, a prestigious choreographer who inherited the school from Ballanchine. We mentioned to her the coming of the International Year of Astronomy and she immediately started working on a ballet to honor Galileo.

The ballet lasts about 15 minutes and is divided into two sections, Galileo's meditations, and his trouble with the church. The music is from Music for Strings, Percussion and Celesta by Béla Bartók. The choreography is performed by six male dancers, who convey it with great strength.



Advertisement poster by Juan Carlos Yustis

The inaugural performance was dedicated to the Instituto de Astronomía on 22 June 2008 and is part of an effort to merge certain aspects of science and art. People from institutions that have sponsored the preparatory activities, including the one described in our March 2008 Newsletter on mass observations in the main plaza in downtown Mexico City, were invited to the performance.

Galileo is staged by two different groups of dancers; the idea is that the company may travel to other cities to perform it, without interrupting its weekly presentations. We must comment that the star dancer was ill and the understudy was in Europe, so Gloria Contreras herself danced the part of Galileo which was an extremely rare and moving event. She mentioned after the performance that it was the first time she had danced with a beard.

We interacted with the company in different ways: providing it with written materials from the Correo del Maestro Publishing House, two books, Experimentos de Galileo, Silvia Torres and Consuelo Doddoli, 2008; Galileo 400 Años de Astronomía, Héctor Domínguez y Julieta Fierro, 2007; and three articles, Galileo Para Maestros I, II, III, 2006. In addition we wrote a brief biography of Galileo for the program.

We were invited to several rehearsals where we made comments on the performance, the costumes and the set design.

The Instituto de Astronomía photographer Juan Carlos Yustis created the advertisement poster and an exhibit for the foyer using astronomical pictures. We believe dance is a magnificent way to set the stage for the International Year of Astronomy.

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ASTRONOMY AND WORLD HERITAGE

In an effort to recognize places important to our scientific heritage and to encourage countries that currently do not have a United Nations World Heritage Site, UNESCO searched for a science that was present throughout history and practiced in all cultures. They decided that astronomy was that science. In 2005 UNESCO approved a new thematic initiative for future – World Heritage Sites: Astronomy & World Heritage. Ten criteria exist of which at least one has to be met for properties to be nominated to become World Heritage Sites. These criteria are on the UNESCO website at http://whc.unesco.org/en/criteria/. In addition, Astronomy & World Heritage adds four sub-criteria, one of which has to be met by the property in order for it to be considered as part of this new initiative. The Astronomy & World Heritage sub-criteria are

1. properties which by their concept and/or the environmental situation have significance in relation to celestial objects or events
2. representations of the sky and/or celestial objects or events
3. observatories and instruments
4. properties with an important link to the history of astronomy.

The first sub-criterion includes built structures such as temples, pyramids, megalithic sites and other monuments. Those aligned to celestial events such as the midwinter sunrise or the annual first appearance of a bright star like Antares in the night sky are appropriate. A familiar example is Stonehenge in the United Kingdom. The second sub-criterion covers the humanistic expression of the sky, such as paintings, murals, and rock art, but also includes urban areas that are laid out along celestial patterns. The third sub-criterion focuses on observatory buildings and instruments such as telescopes, but also includes places and landscapes that are used repeatedly to observe the night sky which may not be in buildings. The fourth sub-criterion focuses on properties important to the development of astronomy but that do not meet the previous three sub-criteria. This would include locations where scientists viewed celestial events such as the transit of Venus across the face of the Sun, as well as important monuments such as the houses of famous astronomers.

For astronomers this initiative is an opportunity to identify properties that can then be preserved for all time. However, the process of creating a nomination file to be presented to UNESCO can take several

years and is generally beyond the experience and job description of astronomers and other people involved in astronomy. However, their input is essential for the identification of potential sites. To address this issue, the UNESCO World Heritage Staff with the financial backing of the Royal Astronomical Society created a web space for astronomers and other interested researchers to discuss potential properties and to add potential properties to a database specifically for the initiative. The public website is http://whc.unesco.org/en/activities/19/. Logging on is necessary to enter the web space and registration is free. The web space and database is a clever way to bring astronomers and other scholars into the process while avoiding bureaucracy, diplomacy, and travelling to meetings. The web space is available to country officials who are interested in nominating new properties under this initiative. Thus it is an interface between astronomers and government officials. The country officials can search the database specifically for potential properties within their borders.

When the Astronomy & World Heritage initiative was established it was projected to be one of the unifying activities associated with the United Nations International Year of Astronomy 2009. The hope was that new World Heritage Sites would be inscribed by 2009 under the new initiative. However, the goal of inscription by 2009 probably was not realistic. Looking at the time necessary for inscription, it takes about two years for a decision to be made once UNESCO has the nomination file. This is in addition to the years needed to create a UNESCO nomination file. Looking at the United States as an example, before a property can be nominated to UNESCO it has to be declared a National Historic Landmark by the United States Parks Service. They have their own nomination file that needs to be submitted for each property. Once the file is created it can take up to ten years for the Parks Service to grant Landmark status. There are several observatories that are currently National Historic Landmarks that could be put forward under the Astronomy & World Heritage initiative, but they would have had to have been nominated in 2007 to be inscribed by 2009.

The Société Européenne pour l'Astronomie dans la Culture (SEAC) and the International Society for Archaeoastronomy and Astronomy in Culture (ISAAC) adopted another strategy. There are several properties already on the World Heritage List that can be considered under the Astronomy & World Heritage initiative. It is possible to have these properties reclassified to include the astronomy designation, perhaps taking less time than inscribing a new property. In the 2007 joint meeting of these two societies, members were encouraged to search the current World Heritage List for sites appropriate for the new initiative. This was followed up by a request from Clive Ruggles (UK) for members to email him their suggestions of both new properties and properties that could be reclassified by January 2008.

The 2009 inscription date corresponding to the International Year of Astronomy 2009 was probably unrealistic. However, the Astronomy & World Heritage Thematic Initiative is permanent, thus astronomers are encouraged to continue to work towards identifying potential properties, beyond this deadline.

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A DOCTORAL PROGRAM IN CULTURAL ASTRONOMY AND ARCHAEOASTRONOMY

The physics faculty of Ilia Chavchavadze State University Tbilisi, Georgia has established a doctoral program in Cultural Astronomy and Archaeoastronomy. Any persons (from any country) with a masters' degree in astronomy, physics, mathematics, archaeology, history, ethnography, culturology, or philosophy may apply. There is no age limit. The program is free of charge, and its duration is 3-5 years. PhD students must be in Georgia 3 months per year as a minimum. Other times of the year will dedicated to distance work. Students will obtain a normal academic PhD. Any questions, comments, or ideas you can send to the Head of the doctoral program, at the email below.

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ESO'S "CATCH A STAR" COMPETITION

School students and teachers across Europe and around the world discovered in May who had won fantastic prizes in the Catch a Star astronomical competition, run by ESO and the European Association for Astronomy Education (EAAE).

Read more at http://www.eso.org/public/outreach/press-rel/pr-2008/pr-14-08.html

ESO Information
information@eso.org esonews@eso.org

FIFTH ISSUE OF THE LATIN-AMERICAN JOURNAL OF ASTRONOMY EDUCATION (RELEA)

We are pleased to announce the release of the fifth issue (pdf) of the Latin-American Journal of Astronomy Education (RELEA), available at the site
http://www.astro.iag.usp.br/~foton/relea/index.html

Once again, we acknowledge your collaboration and valuable support. We would like to request, not only a wide advertising of this issue, but also a personal effort in launching a campaign for articles to be submitted to our Journal. In this respect, we also ask you to read, in particular, our reflections and concerns in the editorial of this second issue.Any comments and suggestions may be sent directly to Paulo Bretones (at the email address below).

Paulo S Bretones, Luiz . Jafelice, Jorge H Horvath
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RESOURCE GUIDE ON WOMEN IN ASTRONOMY

An updated, expanded resource guide to the role women have played in astronomy, and are playing in the development of astronomy, is now available on the website of the non-profit making Astronomical Society of the Pacific, http://www.astrosociety.org/education/resources/womenast_bib.html

The guide includes both printed and web-based materials, and has general references on the topic, plus specific references to the work and lives of 32 women astronomers of the past and present. All the materials are at the non-technical level and are thus appropriate for student papers, curriculum development, or personal enrichment.

The guide makes reference to 178 different web resources, as well as books and articles that are either in print or to be found in many larger libraries.

This resource guide is part of a series that can be found on the Society's website, on such topics as the astronomy of many cultures, debunking astronomical pseudo-science, and resources for astronomy education.

Andrew Fraknoi
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ASTRONOMY EDUCATION REVIEW: 13TH ISSUE

Astronomy Education Review (AER), the web-based journal/magazine about astronomy education and outreach, announces the on-line publication of its 13th issue, now complete on the website at http://aer.noao.edu. There is no charge for reading or downloading the full articles in the journal. When you go to the AER site, you will see that the next issue is already under way. You can find the full 13th issue by clicking on Back Issues, and then on Volume 7, no. 1.

The AER actively solicits interesting papers and articles on all aspects of astronomy, space science education, and outreach. The journal gets between 130 000 and 270 000 hits per month from every state of the USA and over 90 other countries. All papers are refereed and a set of guidelines for contributing to the AER are available on the website.

Sidney Wolff and Andrew Fraknoi, Editors
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NEWS OF MEETINGS AND OF PEOPLE

THE XIII INTERNATIONAL ASTRONOMY OLYMPIAD (IAO), 13-21 OCTOBER 2008, TRIESTE ITALY

Ninety three high school students took part in the XIII International Astronomy Olympiad (IAO) held in Trieste Italy, 13-21 October 2008. Nineteen teams took part. All of them were selected in 2008 during National Olympiads and Camps of the participating states.

Trieste Astronomical Observatory (OAT) of the National Institute for Astrophysics (INAF) formed the Local Organizing Committee, and the International Centre for Theoretical Physics (ICTP) hosted the Olympiad. Participants lived in the Adriatico Guesthouse of ICTP.

The competing part of the XIII IAO consisted of three rounds: theoretical, observational, and practical. The theoretical round involved five classical problems in branches of astronomy, astrophysics, space physics, and hypothetical situations. Due to bad weather, the tasks in the observational round were replaced by questions about recognizing classes of galaxies. The practical round consisted of two problems and analysis of the given observational data.

By the decision of the international jury, which consisted of representatives of 18 countries, 57 students were awarded gold, silver or bronze medals, including students from Armenia, Bulgaria, China, India, Korea, Romania, and Russia winning gold. Park Woo Rhim (Korea) and Vadim Lebedev (Russia) attained the best result in the junior and senior groups respectively.

Alongside the competing part, the Olympiad included scientific excursions to Basovizza Observatory and Elettra Synchrotron, astronomical observations, scientific lectures, a visit to Miramare Castle and Park, a cultural programme, sports activities, and an excursion to Venice.

The website of the XIII IAO is http://www.issp.ac.ru/iao/2008/

The International Astronomy Olympiad is an annual science-education event for students of junior high school classes – 14-18 years old. The Euro-Asian Astronomical Society founded the IAO in 1996. The Olympiad includes an intellectual competition between these students.

The style of the problems in the IAO is aimed at developing the imagination, creativity, and independent thinking. They stimulate the students to recognize the problem independently, to choose a

model, to make necessary suppositions, estimations, and to conduct multiway calculations or logic operations. The rounds are not tests of speed or memory or knowledge of formal facts and data, and all basic data and formal facts are provided to the students. The methods of solutions are of the first priority in evaluations of the participants' solutions, while the correct formal final answer (formula or numerical value) does not play the determining role in the evaluation. Participants should have a possibility to exhibit their analytical capacities, and not just to do all procedures by hard rules. Also, the jury does not require that participants follow the solution that is written by the author or composer of the problem.

The competition at the International Astronomy Olympiad is not the only part of the programme. The IAO is carried out in the spirit of friendship and tolerance, where the competition is a stimulus for showing the participants' capabilities. Contacts, exchange of ideas, and collaboration between students, teachers and scientists from various countries are of primary importance.

The XIV International Astronomy Olympiad to be held in Autumn 2009, at a place not yet decided. Information will be presented at http://www.issp.ac.ru/iao/2009/ (Ed. not yet available). We hope that more countries will participate in next year's event.

Michael Gavrilov, Chairman of the Council of IAO
Conrad Boehm, Chairman of the LOC of the XIII IAO
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MILTON KEYNES FESTIVAL OF SCIENCE, 17-31 OCTOBER 2008, MILTON KEYNES UK

Milton Keynes, where I live and where the main campus of the Open University is located, is a new town, started in the late 1960s, and located roughly half way between London and Birmingham. Its population is currently a quarter of a million, set to rise to 400 000 over the next decade.

In the summer of 2007 the first MK Festival of Science was held, with special events for schools as well as events for the general public. It was sufficiently successful for it to be repeated in 2008, and at the time of writing it is coming to its end.

The two main astronomy education activities of 2008 were an interactive exhibit in the city centre aimed at all ages, on how exoplanets are being discovered, and a competition for primary school children in Milton Keynes, Design an Alien Lifeform. There were also planetary science activities, and astronomy/planetary science talks.

The "Alien" competition was organised by my wife Anne (one-time head teacher of primary schools), and me. We organised a similar competition for the 2007 Festival, where it was a huge success, attracting over 800 entries! For a picture of a few children holding their 2007 entries, see my editorial in the March 2008 issue of this Newsletter.

This year the competition was again for primary school children in two year groups, Foundation Year to Year 2 (ages 5-7) and Years 3-6 (ages 7-11). And again there were criteria that each age group had to meet. For the younger group the broad constraints were that the creature lives in a warm part of its world, where vegetation is sparse, and that the creature feeds on other creatures, but nothing is able to feed on it. For the older group the creature lives on a world where gravity is higher than on Earth, in a part of its world where vegetation is plentiful. It can become food for many larger, stronger, faster-moving creatures; the hunter and the hunted were to be drawn. Also the alien had to be shown to be technologically intelligent. Some finer-scale specifications were also given to both groups.

There were fewer entries than in 2007 – a little over 100 – largely because teachers were instructed to send in what they judged to be the best five entries from their class. In both years almost all entries

were from individuals, with a few from pairs of children. As in 2007 there are book prizes and highly commended designations.

This competition has had good feedback from teachers and children alike.

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

USEFUL WEBSITES FOR INFORMATION ON ASTRONOMY EDUCATION AND OUTREACH MEETINGS

The following websites contain information on future (and recent) meetings and conferences on, or very relevant to, astronomy education and development. In compiling this short list I am well aware of a strong European bias. **Please send me by email URLs for relevant websites in other areas of the world.**

UK

The Association for Astronomy Education	http://www.aae.org.uk
The British Association of Planetaria	http://www.bap.redthreat.co.uk
The National Schools Observatory	http://www.schoolsobservatory.org.uk

Europe

The European Association for Astronomy Education	http://www.eaae-astro.org
The European Astronomical Society	http://www.iap.fr/eas
The European Southern Observatory	http://www.eso.org/outreach/eduoff

USA

(among several other good sites)

The Astronomical Society of the Pacific	http://www.astrosociety.org

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

INFORMATION TO BE FOUND ON THE IAU C46 WEBSITE

Among the information contained on the IAU C46 website http://iau46.obspm.fr is the following

- Overview (of C46, in English, French, and Spanish)
- Offices and Organizing Committee
- Program Groups
- National Liaisons (directory) (also at http://physics.open.ac.uk/~bwjones/IAU46/)
- Recent online Newsletters (full archive at http://physics.open.ac.uk/~bwjones/IAU46/)
- Presidents and Current Vice-President
- Resolution on the Value of Astronomy Education (passed by the IAU General Assembly 2003)
- External links
- Announcements/News
- Commission 46 Terms of Reference, Rules & Guidelines

Please note that since September 2007 this website has been hosted and maintained at the Observatoire de Paris. Announcements/news and comments/suggestions should be sent to Chantal Balkowski at Chantal.Balkowski@obspm.fr

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Officers & Organizing Committee

The officers 2006-2009 are: the President, the Vice-President, and the Retiring President. Details of the Organizing Committee, and membership of the Program Groups are at http://iau46.obspm.fr/

National Liaisons **Barrie W Jones (PG Chair)**

These are listed at http://iau46.obspm.fr/ and at http://physics.open.ac.uk/~bwjones/IAU46/