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

Newsletter 76 – March 2012

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.

**PLEASE WOULD NATIONAL LIAISONS
DISTRIBUTE THIS NEWSLETTER
IN THEIR COUNTRIES**

This newsletter is available at the following website
http://astronomyeducation.org
(this is a more memorable URL for the IAU C46 website than
www.iaucomm46.org, to which the new URL links)
and also at
http://physics.open.ac.uk/~bwjones/IAU46/

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EDITORIAL

Thanks to everyone who has made a contribution to this edition of the Newsletter.

As this is my last Newsletter I leave it to my successor and the Organizing Committee to make announcements regarding future issues.

My decision to retire is detailed below.

Book reviews

There are further book reviews in this issue. This feature first appeared in the October 2009 issue and was repeated in the March 2010 and March 2011 issues. Reviews must be of books centred on astronomy education or development.

The C46 websites

The "official" handsome website is at http://www.iaucomm46.org. Jay Pasachoff secured for C46 the more memorable URL http://astronomyeducation.org which links to the "official" website. I'm sure that you'll join me in thanking Jay again. My own website is at the URL http://physics.open.ac.uk/~bwjones/IAU46/ Everything on my website should also be on the "official" website.

My mini-website includes the things for which I am responsible: the Newsletter (including back issues – see below); National Liaison details; and National Liaison triennial reports for 2003-2006 and 2006-2008. The triennial reports for 2009 to 2011 are currently coming in.

Back issues of the C46 Newsletter

Back issues are available at http://astronomyeducation.org (http://www.iaucomm46.org) and also at http://physics.open.ac.uk/~bwjones/IAU46/. Newsletter 49, October 1998 (the first I edited) has been scanned from hard copy, so the quality of reproduction is only modest. This is also the case for earlier ones, edited by John Percy. These extend back to February 1992, but there are gaps.

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THE EDITOR IS TO RETIRE

I took over from John Percy as Editor in 1998. My first issue was in October that year, and I've edited March and October issues ever since. This issue, number 76, March 2012, will be my last. This is not entirely because of my stroke in late April 2011, resulting in lack of energy, it's also because, after nearly 14 years, it's time for a change, and because after so many years my enthusiasm for the job has diminished.

The Editor, Barrie W Jones

I've enjoyed editing the Newsletter. But a new editor should bring a fresh approach. I'd be glad to facilitate the changeover.

Commission 46 is about to undergo large changes. These are detailed in the Message from the President.

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MESSAGE FROM THE PRESIDENT

Commission 46 will be different after the General Assembly in Beijing. The Office of Astronomical Development (OAD) introduces a new way to work in the IAU and Commission 46 will be a very different commission in the future. Our funded program groups of ISYA, WWDA, TAD and NASE have all been taken over by the OAD in Cape Town.

The Commission remains to promote astronomy education and development by organizing conferences or meetings and through the medium of our Newsletter and National Liaisons. However, we will now lose all the funded activities that were in place with the four funded program groups. Commission 46 must remain as a committee of professionals within the IAU that will help student's education in schools, universities, and teacher training, but at the same time help train future scientists.

It is important that Commission 46 has time to discuss how to conduct its activities related to the OAD and the task forces that will be created. Members of Commission 46 have shown expertise and dedication for a lot of years. They should be involved in the education activities of IAU. It is necessary to investigate, to explore the possibilities of cooperation of our Commission with the new structures of IAU. Commission 46 could combine their task with the OAD in order to reinforce our activities as a Commission without founded groups, but it will be a normal Commission inside the IAU.

The OAD will work with regional nodes, many of them volunteers. At present they have a list of 400 volunteers interested to work on different tasks. Commission 46 has 332 members that have had expertise for a long time working for the IAU. It is important that we coordinate our forces.

For all these reasons we need time to discuss in Beijing our future. We have been allocated 4 sessions for our business: Thursday 23 August 14-15:30 and 16:00-18:00, and Tuesday 28 August 14:00-15:30 and 16:00-18:00. These time slots were worked out so that there were no clashes with SPS17 (Light Pollution) which has the support of our Commission. From these pages we invite all Commission members that participate in the General Assembly in Beijing to participate actively in the business sessions announced above.

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THE GALILEOSCOPE
A LEGACY OF THE IYA AND TOOL FOR ASTRONOMY EDUCATION

As a cornerstone project of the 2009 International Year of Astronomy, *Galileoscope* was initiated to develop, produce, and distribute telescopes of a suitable size and type and at a low-enough price to bring hands-on astronomy to the masses, especially those unable to afford a telescope. It is hard to deny that this project succeeded, with nearly 200 000 telescopes distributed to over 100 countries, and over 7000 distributed in a donation program to those who could not otherwise purchase a telescope.

The Galileoscope with its box

Galileoscope continues today in many forms. There is the installed base of telescopes being used by tens of thousands around the world. There is an active on-line community where there are many posts about what has been done with *Galileoscopes*. There are education programs and materials that have been published so that teachers and other educators have content to use to teach optics and astronomy, including the National Optical Astronomy Observatory's *Teaching with Telescopes* program, the Galileo Teacher Training Program conducted with Hands on Universe, and the publication of *Galileo's Classroom*. And, most importantly, *Galileoscopes* are still being manufactured and distributed, and are available to the community as a continuing resource. This project is a continuing legacy of the IYA, connecting people to the sky worldwide.

For those not familiar with the program, the *Galileoscope* is a 50mm (2 inch) aperture refracting telescope of focal length 500mm, with an eyepiece assembly that can produce 25x or 50x with an included Barlow lens, and which can also be set up to operate similarly to Galileo's original telescope. The unit comes as a kit, allowing the user to not only *have* a telescope, but *learn* how one works and is put together. The design goals for the *Galileoscope* included features to make the telescope useful to as wide a range of potential users as possible, including a tripod attachment, a wide range of focus, good reduction of stray light and scatter, high-quality glass objective optics, and optical characteristics that make it effective for observing objects visible from urban sites, as well as from rural locations. The aperture and focal length were chosen to assure that the bands and moons of Jupiter, the rings of Saturn, phases of Venus, and lunar features would all be well seen, and a range of deep-sky objects would also be visible from better sites. Reviews and comments posted on many astronomy forums confirm that these goals were well met.

There is no question that the best way to engage the public with astronomy is for the experience to be hands-on. It is easy to initially "wow" people with pictures taken with large telescopes or spacecraft, but the real connection comes from actually *seeing* the wonders of the Universe directly. This applies whether one is doing public outreach or astronomy education in formal settings. And, in the case of the *Galileoscope*, the experience can be one that is continued indefinitely when a participant takes home a quality, easy to use telescope that can continue to engage them with the sky.

The Galileoscope in use

As a volunteer effort, *Galileoscopes* are supplied at the lowest possible cost. They are available in individual units from several retailers, and in bulk (case) quantities directly from *Galileoscope* (www.galileoscope.org), and are a perfect complement to outreach and teaching activities. We hope the community will continue to acquire *Galileoscopes* and utilize them in their programs, get them into the hands of children and adults everywhere, and sustain the efforts begun during the International Year of Astronomy.

There is a major new initiative for 2012 to carry forward the *Galileoscope* program, *Telescopes4Teachers*, through which individuals or organizations can donate funds for *Galileoscopes* to be sent to the teachers or schools that they designate. The program will launch in mid-spring 2012, and telescopes will be available for teachers before the school year begins in September 2012. We hope this will result in thousands of teachers adding optics, science history, and astronomy to their classrooms.

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A DIFFERENT PATHWAY TO THE STARS
THE CZECH NETWORK OF PUBLIC OBSERVATORIES

Public access to telescope viewing in the US and Canada is mainly through amateur groups and college observatories. But locating such venues and coordinating with their schedules can be hard when a family wants to view the Moon or brilliant Jupiter at short notice. A recent trip to the Czech Republic showed me another pathway to the stars that might teach us some interesting lessons about the popularization of astronomy.

The public observatory in Vsetin (population about 29 000)

In this small central-European nation, similar in area, population and climate to Massachusetts and Connecticut, astronomy is represented by a unique network of 44 municipally-financed public observatories.

Currently, 24 of these are professionally staffed and offer lecture facilities, exhibition space, and some even have planetaria. Our Massachusetts town has trouble budgeting for a library, so how do small Czech towns manage to fit professional astronomers into their priorities?

The story started in the town of Pardubice near Prague, where an enlightened local aristocrat, one Baron Arthur Kraus, founded an observatory in 1912. Its fine 150 mm aperture Merz refractor was used partly for regular solar observations but its main aim was to provide astronomy instruction for the town's citizens.

The baron's enthusiasm encouraged the founding of The Czech Astronomical Society in 1917. His observatory was a start, but the first major element of the network was the Stefanik Observatory on Petrin Hill in Prague, built in 1928. This impressive structure, set in a beautiful park overlooking the capital, has always been a popular attraction for citizens and tourists. Over 33 000 visitors per year enjoy daily viewing of the Sun and night-time celestial sights through its four main telescopes, which include a pair of co-mounted Zeiss refractors of 200 and 180 mm aperture. Such excellent Zeiss instruments were the standard at the time; a 12 inch (300 mm) Zeiss was installed a few years later at America's most famous municipal observatory in Los Angeles' Griffith's Park.

The Petrin Observatory was followed in 1937 by another in Ceske Budejovice (once known as Budweis, where Budweiser beer originated), and in 1938 in the smaller town Tabor south of Prague. The aim of these early installations was to provide easy access to the wonders of the night sky for everyone and they also served as a nucleus for amateur clubs. In the period between the two World Wars, Czechoslovakia was a highly industrialized, democratic nation and astronomy was recognized as an important element in the education of its citizens. We would do well to remind ourselves of this in the USA today.

Zeiss 200 mm and 150 mm refractors at Vsetin Observatory

Most of the observatories were built, however, after WWII. The Communist government that took power in 1948 believed that astronomy instruction would help combat the influence of the Church. It didn't, but the idea provided funding that helped build Czech amateur astronomy. When Sputnik was launched, tracking of Soviet satellites by amateur astronomers provided another funding source. After 1948, the number of observatories grew rapidly to probably the highest density of such public facilities anywhere in the world.

To achieve success, observatories need to be staffed by competent and enthusiastic personnel. My recent visit during a regular evening viewing session impressed me. Besides our group, two families with small children listened intently in the dark dome as the astronomer on duty showed lovely views of Epsilon Lyrae, M13, and a comet. He explained clearly the separation in astronomical units of the double's close components, the likelihood of collisions between the globular cluster's densely packed stars, and the probable origin of the periodic comets. The children asked some good questions. It was a memorable evening, and it cost about $1 per person.

The staff backgrounds range from undergraduate astronomy majors to PhD astronomers. So this network provides a significant source of useful employment for university astronomy graduates. Some amateur programs at the observatories in turn produce candidates for research in astronomy. One of them, Kamil Hornoch, won the Amateur Achievement Award of the Astronomical Society of the Pacific in 2006 for his discoveries of dozens of novae in other galaxies. He is now a professional astronomer.

Hundreds have enjoyed viewing at the small observatory I built in our seaside community near Boston. Examining the Sun, Moon or planets through an eyepiece provides an experience not matched by viewing Hubble images on a computer screen. I have boxes of enthusiastic letters from schoolchildren to prove it. So why are there so few municipal observatories in the USA?

The mistaken belief that astronomy is not possible from light polluted towns is partially to blame. Many do not realize that the best objects for small telescopes can be viewed perfectly well even from downtown Manhattan. Inadequate funding is another often-cited barrier. But $50 million-$100 milion price tags for high schools with elaborate athletic facilities are increasingly accepted by many suburban US taxpayers.

Would it be unreasonable to build a $49million high school and set aside $1million to build and endow the operation of a professionally staffed community observatory? It's a matter of priorities. We should give it some thought - Czech schools rank well above their US counterparts in international comparisons of science and math skills.
Peter Foukal, Nahant, MA, USA, and Stepan Kovar, Prague, Czech Republic

Peter Foukal is a solar physicist whose publications include cover articles in *Nature*, *Science,* and *Scientific American*. He is currently preparing the 3rd edition of his graduate text *Solar Astrophysics* (Wiley- VCH).
Stepan Kovar is a software and systems engineer with IBM in Prague, the Czech Republic. He is a past President of the Czech Astronomical Society.

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THE 05 JUNE 2012 TRANSIT OF VENUS

05 June 2012 will see one of the most significant astronomical events of the 21st century, a transit of Venus, when Venus passes across the face of the Sun. The next transit of Venus won't be until the year 2117, 105.5 years later. For hundreds of years, observing transits of Venus was the key to finding the Astronomical Unit, which Airy, England's Astronomer Royal, called "the noblest problem in astronomy." Edmond Halley's 1716 calculation that astronomers could triangulate the distance to Venus and therefore, through Kepler's third law, throughout the Solar System, led to hundreds of expeditions from many countries being sent all over the world, since observations were needed from as widely spaced latitudes as possible.

I recorded a 22-minute video about the transit at the academic society Phi Beta Kappa's website:

http://www.pbk.org/home/playpodcast.aspx?id=772.

It can be expanded to full-screen size at

http://www.youtube.com/watch?v=fVVaCoNT1pg

A brief audio piece I recorded about the transit, with a transcript, is at

http://365daysofastronomy.org/2011/06/05/june-5th-transit-of-venus/

An interview with me about the transit in a National Geographic blog is at

http://blogs.nationalgeographic.com/blogs/news/breakingorbit/2011/03/watch-planet-transit-2012-venus.html

The film-maker Maarten Roos has posted a video of a series of four talks (Paolo Tanga of the Observatoire de la Cote d'Azur at Nice; Jean-Eudes Arlot of l'Institut de Méchanique Céleste et de Calcul des

Éphémérides of the Observatoire de Paris; Jay Pasachoff of Williams College; Lou Mayo of NASA's Goddard Space Flight Center) about the transits of Venus, past, present, and future, from last October's meeting of the American Astronomical Society's Division of Planetary Science in Nante France http://transitofvenus.nl/wp/2011/10/16/four-giants-talk-about-transits/

I have prepared an "Academic Minute" (www.wamc.org/academic-minute.html) about the transit of Venus, 120 seconds that will be broadcast on a variety of US Public Radio stations on June 4:
http://maps.google.com/maps/ms?hl=en&ie=UTF8&msa=0&msid=218117814923339210114.00049eb26e3add8477d53&ll=37.300275,-96.152344&spn=31.755358,56.513672&source=embed

Many public venues and amateur-astronomy groups will make telescopic observing available to see the transit. Even with just a simple solar-safe filter, but a specially dense and safe one, such as those available from the Baader Planetarium in Europe, www.baader-planetarium.com, or www.thousandoaksoptical.com or www.rainbowsymphony.com in the US, you could see the dot of Venus silhouetted against the Sun during the six hours of the transit.

Websites dealing with the transit include
www.transitofvenus.info
www.transitofvenus.org
www.transitofvenus.nl

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IAU OFFICE OF ASTRONOMY FOR DEVELOPMENT (UPDATE)

The IAU Office of Astronomy for Development (OAD) continues its efforts towards realising the IAU decadal strategic plan. A most significant event was the first OAD stakeholders workshop which was held 12-14 December 2011 at the South African Astronomical Observatory in Cape Town with 55 participants from 28 different countries http://www.astro4dev.org/index.php/oadevents/oadworkshop

Attendees included representatives of relevant Commission 46 Program Groups, Commission 55, other IAU-endorsed activities (Galileo Teacher Training Program and Universe Awareness) and external organisations interested in contributing to implementation of the IAU Strategic Plan. The workshop was streamed via the web and input was openly sought both from attendees and the greater public regarding the implementation of activities. The format of the workshop mostly consisted of several five-minute talks followed by extensive discussions, focusing on such matters as governance of the various envisaged Task Forces, the nature of Regional Nodes, and future fund raising campaigns. Additional topics such as the role of distance learning, institute twinning and evaluation in future capacity building programmes were also talked about at length.

This workshop was an essential stepping-stone on the road to implementing the IAU Strategic Plan. The second meeting of the OAD Steering Committee was held directly following the workshop and devoted considerable time to discussing the next stage in implementing the Plan.

Since then the OAD has issued an Announcement of Opportunity for the establishment of Regional Nodes and Language Expertise centres across the world. We hope that the initial regional nodes will be established in time for the General Assembly in Beijing in August. The OAD also issued an open call for nominations for members of the three Task Forces (Universities & Research, Schools and Children, and Outreach to the Public). In consultation with the OAD Steering Committee and the IAU Development Oversight Committee, the initial membership of the Task Forces was recently established. It will now be up to the Task Forces to recruit more members as required and set up necessary sub groups. To date the OAD has had over 400 people volunteer their time towards these activities, so the Task Forces already have quite a sizeable pool of volunteers to choose from. Some examples of (proposed) activities of the Task Forces which may be of interest to C46 members are

- Visiting Astronomer/Exchange programmes (including long term visits e.g. during sabbaticals)
- University Twinning programmes
- International Schools for Young Astronomers (ISYA) - postgraduates
- Undergraduate astronomy schools/workshops

- Produce a distance learning package/guideline
- Provide guidelines on using robotic telescopes
- Establish an association of ISYA alumni
- Identify Technology internships e.g. instrument specialists
- Explore Virtual Observatory outreach opportunities
- Develop a sample Introduction to Astronomy curriculum
- Determine evaluation guidelines and criteria for activities
- Implement a telescope adoption programme (existing observatories "adopt" a facility in a developing region)
- Collaborate with institutions such as NSF, where a percentage of research grants are spent on development
- Develop an open source text book for astronomy
- Teacher Training and development.

At the IAU General Assembly in Beijing the OAD will host a Special Session (SpS11) on the Strategic Plan and OAD (http://www.astro4dev.org/index.php/oadevents/iauga). This will carry a similar format as the OAD stakeholders workshop, including an update on OAD activities. We invite members of C46 to submit abstracts that would be relevant to that session. Closing date for abstracts is 17th March 2012. Note from Editor: this deadline has now passed.

Watch the OAD website (www.astronomyfordevelopment.org) or join the OAD mailing list to keep informed of the latest developments.

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RELEA: 12TH ISSUE

We are pleased to announce the release of the twelfth issue (pdf) of the "Latin-American Journal of Astronomy Education" (RELEA), available at the site
http://www.relea.ufscar.br/

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 RELEA. In this respect, we also ask you to read, in particular, our reflections and concerns in the editorial of this twelfth issue.

Any comments and suggestions may be sent directly to Prof Paulo S Bretones at the address
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CLASSROOM POWERPOINTS AVAILABLE IN SPANISH

The Division for Planetary Sciences (DPS) of the American Astronomical Society announces the release of "Descubrimientos en Ciencias Planetarias", the Spanish translation of the "DPS Discoveries" Classroom Powerpoints. We're grateful to Pedro Sada, Universidad de Monterrey, Mexico for his efforts. The most recent release in both languages is "A Planet Orbiting Two Suns" about the recently discovered planet nicknamed Tatooine.

These classroom slidesets are succinct summaries of discoveries too recent to appear in introductory astronomy college textbooks. Each set consists of just three slides to be shown: the discovery itself, a basic explanation based on good planetary science, and the "big picture" context. A page for further information is provided as well. Powerpoints and PDF's can be downloaded from
http://dps.aas.org/education/dpsdisc
which has links to the Spanish and English versions.

The 22 previous releases cover these topics
- A Thousand New Planets, Buried Martian Carbonates, The Lunar Core, A Six Planet System, Martian Gully Formation
- Propellers in Saturn's Rings, Venus' Active Volcanism, Martian Glaciers, Titan Lakes, Explaining Iapetus
- Waterworld at 40 Lightyears? Discovery of a Rocky Exoplanet, Lunar Water, Jupiter Impact Event, Oceans on Enceladus
- The TC3 Meteorite, 2012 Doomsday Rumors, Mars Sulfur Cycle, The First Images of Exoplanets
- Methane in the Martian Atmosphere, The Chaotic Early Solar System, Volcanoes on Mercury.

For more information, contact Nick Schneider & Dave Brain at
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20 YEARS OF UNITED NATIONS BASIC SPACE SCIENCE INITIATIVE (1991 – 2012)

The United Nations Basic Space Science Initiative (UBSSI) is a long-term effort for the development of astronomy and space science through regional and international cooperation. It covers an active transfer of technology and knowledge, and the role of education on a worldwide basis, particularly in developing nations. To address the status of astronomy in Asia and the Pacific, Latin America and the Caribbean, Africa, and Western Asia, a series of workshops on Basic Space Science (BSS) was carried out between 1991 and 2004 in the following countries: India (1991), Costa Rica and Colombia (1992), Nigeria (1993), Egypt (1994), Sri Lanka (1995), Germany (1996), Honduras (1997), Jordan (1999), France (2000), Mauritius (2001), Argentina (2002), and China (2004). Detailed information is available at (http://neutrino.aquaphoenix.com/un-esa/). In line with one of the major recommendations emanating from these workshops, the establishment of astronomical facilities in developing nations for research and education programmes at the university level was initiated.

Pursuant to resolutions of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and its Scientific and Technical Subcommittee, since 2005, these workshops focused on the International Heliophysical Year 2007 (IHY2007) and took place in the following countries: the United Arab Emirates (2005), India (2006), Japan (2007), Bulgaria (2008), the Republic of Korea (2009). More detailed information can be obtained from the website of the United Nations Office for Outer Space Affairs (UNOOSA) at: (http://www.unoosa.org/oosa/SAP/bss/ihy2007/index.html).

After deliberations at the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), beginning in 2010, the workshops began to focus on the International Space Weather Initiative (ISWI) as part of its three-year work plan. Detailed information is available at (http://www.stil.bas.bg/ISWI/). Workshops on the ISWI were scheduled to be hosted by Egypt (2010) for the benefit of developing countries in Western

Asia, Nigeria (2011) for Africa, and Ecuador (2012) for Latin America and the Caribbean. Currently, 14 IHY/ISWI instrument arrays with more than 600 instruments are operational in 95 countries.

Space weather instruments (best resolution available)

In addition, to aid the global navigation satellite systems (GNSS) users community in dealing with the effects of space weather and ionospheric disturbances on GNSS performance, ISWI is supported by the programme of GNSS applications implemented by the United nations Office for Outer Space Affairs in its capacity as the Executive Secretariat of the International Committee on GNSS (ICG). ICG is contributing to and co-sponsoring several of the ISWI activities. Detailed information is available at the ICG Information portal at (http://www.icgsecretariat.org).

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BOOK REVIEWS

WOMEN IN EARLY BRITISH AND IRISH ASTRONOMY: STARS AND SATELLITES

Mary Brück, (Dordrecht: Springer, 2009). xvii + 277. $129 (hardcover). ISBN 978-90-481-2742-5. ISBN: 9048124727, 3.6 Mbyte (e-book).

This is not a beautifully written book, but it is a valuable one, not only for astronomy educators but also for historians of science and social historians, as well as for their students who are interested in both women's studies and astronomy.

In his Foreword to the book, Oxford University historian of science Allan Chapman calls author Mary Brück "an established and illustrious pioneer" in "the study of the role of women in astronomy." Brück, whose acknowledgements are dated May 2008, died on December 11th of that year, and possibly didn't live to read through the final proofs herself. It is possible that had she done so, Brück would have eliminated some of the impediments to reading that bothered me, such as the frequent repetitions and distracting typos (18th for 80th, for example). Other issues that she is unlikely to have changed include the absence in the chapter titles of the names of the women whose lives and work are covered therein, and the failure to sort the women into the two groups alluded to in the subtitle, with its astronomical *double entendre*: "stars and satellites," namely those women who made independent scientific contributions, regardless of whether or not they were married or otherwise related to a male astronomer (the stars), and those who were satisfied with assisting the work of the men in their lives and were unconcerned with getting credit for their contributions (the satellites). With regard to the latter group, Brück indicates more than once that they "colluded" in their obscurity. Only very rarely does Brück indicate straightforwardly the category into which her women subjects fall. She concludes Chapter 9, for example, about two "expedition wives," Jessie Duncan Smyth (wife of Charles Piazzi Smyth) and Bella Black Gill (wife of David Gill) with this summary: "Bella was, like Jessie, a satellite to her star. Yet there is no doubt that the high-altitude astronomy tests on Tenerife in 1856 and the observations of Mars on Ascension in 1877 - two pioneering enterprises on these Atlantic islands - would never have been undertaken let alone accomplished without the stoutheartedness and encouragement of these intelligent skilful collaborator-wives."

I was interested to read in an obituary published by the Astronomical Society of Edinburgh that Brück, née Mary Conway, earned a PhD in 1950 from the University of Edinburgh for a study of H-alpha line profiles in prominences; a number of the women we meet in the book also specialized in solar physics. She later switched research fields to stellar studies, using three-color photometry to study the southern galactic clusters, specializing in the Magellanic clouds. From the obituary I also learned that, like many of the women she covers, she married an astronomer; Hermann Alexander Brück was director of the Dunsink Observatory in Dublin, where Dr Mary Conway took her first post-PhD post. After her husband became Astronomer Royal for Scotland, Regius Professor of Astronomy at the University of Edinburgh, and Director of the Royal Observatory Edinburgh, she was hired by the University of Edinburgh, first as a part-time lecturer, then full-time, and finally Senior Lecturer. So Brück might have qualified for "star" treatment in her own book. Like some of the women whose work she recounts, she participated in solar eclipse research with her husband and, although she began her work in the history of astronomy in collaboration with him, she became an independent historian of astronomy, publishing books and papers in the field on her own.

In the book under consideration here, in seventeen chapters Brück profiles more than thirty women who, between the early 18th and the mid-20th centuries, made contributions either as scientific researchers or as educators and popularizers of astronomy. Some are well known, including (in the first category) Caroline Herschel and (in the second) Mary Somerville. Others have famous last names, including Margaret Cooke Flamsteed; Mary, Countess of Rosse; and Annie Scott Dill Russell Maunder. Most, however, are obscure, and Brück does a service by bringing them out of what she calls in her introduction "the shadows" to illustrate "the slow progress of women towards equal status with men in the world of science."

While before reading this book I knew quite a lot about Caroline Herschel (see my review of Michael Hoskin's *Discoverers of the Universe: William and Caroline Herschel* in the spring 2011 issue of this Newsletter), something about the role that Margaret Flamsteed played in getting her husband's star atlas published after his death, and had seen, on my visit during the Manchester IAU in 2000 to Lord Rosse's "Leviathan," examples of the early photographic prowess of Mary, Countess of Rosse, I learned an enormous amount from this book. For example, like many Americans interested in the struggle of women to establish themselves as professional astronomers in their own country, I had known of Edward Pickering's underpaid

and over-qualified "harem" of female "computers" whose data processing at the Harvard Observatory resulted in 1890 in the Henry Draper Catalog, which classified over 10 000 stars according to spectral type. I had not known, however, about the first, albeit short-lived, "serious effort in Britain to give women a scientific profession in astronomy," undertaken by Astronomer Royal W M Christie, director of the Royal Observatory Greenwich, who tried to institute his own "lady computer" scheme. Christie's experiment lasted only five years, and, as Brück laments, "It was to be more than 40 years before a woman astronomer would occupy a post of equal status with her male colleagues at the Royal Observatory." The last, best known, and most successful of Christie's "harem" was Annie Russell, who had to resign in 1895 "in accordance with the rules of the civil service, in order to marry Walter Maunder, and to continue her career in a different way. "Following her departure, women seeking positions at the Royal Observatory were informed that "ladies are no longer employed."

As the other book I have reviewed for this issue indicates, the status of women in astronomy in the US is still a serious and unresolved issue. Brück concludes her book with a chapter on Cecilia Payne-Gaposchkin (whose married name she misspells and who is omitted from the book's index). She explains Payne's departure from England, where she "realised that there was no future for a woman in astronomy," for Harvard, having become "aware of the possibility of joining the famous women's team at that great institution." Brück acknowledges that Payne's road to success in the US was not an easy one: "Real though the opportunities for women were in the United States compared with Britain, they still had their limitations." Brück, however, does not describe in detail any of the significant gender-bias-related obstacles that Payne faced in America. While Payne went on to become the first person to receive a doctorate in astronomy at Harvard, she omitted from her thesis her tentative conclusion that hydrogen and helium are the most abundant elements in the Universe, because the implication of her calculations challenged the accepted beliefs of the day. No less an authority in the history of astronomy than Owen Gingerich maintains that Henry Norris Russell convinced Payne to leave this theory out of her thesis, but Russell was content four years later, by which time he had come to accept her conclusion, to have Payne receive less than the credit due her for the insight. Also, during the years Payne served as Harlow Shapley's technical assistant at the Harvard Observatory (1927 to 1938), Shapley paid her salary out of "equipment expenses," often kept her from taking advantage of new electronic equipment for her work, and kept her name out of the university catalogues. Only when Donald Menzel succeeded Shapley as observatory director was she given a raise, promoted to tenure, and named chair of the university's astronomy department.

My reservations about this book are not insignificant ones, but I do, nonetheless, recommend it to the attention of Commission 46 members. At a time when careers in astronomy may be open to both men and women but are limited in number for all, leaving many qualified people of both genders looking about for satisfying employment options, it is interesting to see how women in past centuries managed not only to keep themselves alive intellectually but often also to support themselves using their astronomical interests in ways some highly educated people continue to do today, including offering observing sessions for the public; teaching popular courses in astronomy and related fields; and writing textbooks, popular books, and articles for non-professionals.

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WOMEN IN ASTRONOMY AND SPACE SCIENCE: MEETING THE CHALLENGES OF AN INCREASINGLY DIVERSE WORKFORCE

Anne L Kinney, Diana Khachadourian, Pamela S Millar and Colleen N Hartman, eds., Proceedings from the conference held at The Inn and Conference Center, University of Maryland, University College, October 21-23, 2009. www.nasa.gov

As is the case with most books of proceedings, this is not a tome to pick up if what one is looking for is a compelling cover-to-cover read, but I recommend it to anyone involved in the teaching of astronomy anywhere in the world, as well as to department heads, deans, and hiring committees. As readers learn from papers scattered throughout the book's twelve sections, the meeting whose proceedings are presented was the third on the status of women in astronomy. In 1979, the American Astronomical Society established a standing Committee on the Status of Women in Astronomy (CSWA). Thirteen years passed before a first meeting on the status of women in the profession was held. The Charter for Women in Astronomy, which that 1992 meeting in Baltimore, MD, issued, established the "guiding principles for establishing gender equity:" that scientific ability has nothing to do with gender; that the disparate perspectives that diversity

brings enhance our chances of achieving excellent science; that patterns of recruitment, training, evaluation, and award must be consciously examined in order to promote equal opportunities to women; that a greater representation of women among astronomers would improve the professional environment, thus encouraging more women to enter the field. The 2003 Pasadena Recommendations, which emerged from the second meeting on the status of women in the profession, echoed the principles set forth in 1992. A wrap-up paper toward the end of the book, "Women in Astronomy 2009: Lessons and Outcomes Relevant to Underrepresented Minorities," summarizes the purpose of the three meetings: "Broadly, this series of conferences has addressed issues pertaining to women in our field: demographics of the astronomy community, assessment of the climate toward underrepresented groups, and strategies to diversify our workforce." As noted by NASA administrator Ed Weiler in his remarks, "this is not a conference just about the role of women in astronomy and space science, but rather, it is about the inclusiveness of space science for women and historically underrepresented minorities."

A tension that prevails within the book, as within so many arguments about science education and global economic competition, is the assertion, on one hand, that too few young people choose to pursue scientific or engineering careers, and, on the other, that for those who do choose those careers, the path can be discouraging. Although many students who achieve doctorates in astronomy or related fields aspire to professorial careers, there have only been about 20 to 25 hires per year for the last several years—too few for all the graduate students being trained. And for those who are lucky enough to snag a tenure-track appointment after completing one or two postdocs, there then follow, on average, six years without any guarantee that tenure will be granted at the end. As a result, "there is little stability or security for raising a family until a person is well into their 40's." Why should we be surprised if the best and brightest choose to go into other professions?

With this matter in mind, I found the panel discussion on "Paths to Non-Academic Careers" a useful one. The general advice offered by the panelists, who represent a variety of career opportunities, can be summed up in the words of one of them: "My varied career was not planned.... Look for and take advantage of good opportunities as they arise - do not be slave to some master plan that may never happen. Do not think that no change is a safe path.... All my jobs have been rewarding." I was also struck by the comment made from the audience by octogenarian Nancy Roman, the first female to hold an executive position at NASA and the first chief of astronomy in the Office of Space Science: "I found I could do more good for astronomy with my NASA job than with a research job...for instance, providing funds for many academic researchers."

With regard to science education, a theme that reverberates within several papers in the volume is the need for educators in the US (and other developed countries where many students try to steer clear of math and science courses) to emulate their colleagues in countries whose students achieve higher math scores: "Success for all of our students should be our goal." In Korea, for example, students are assured that everyone can master any subject, while in the US educators assure weak performers in math that they can do something else. With this in mind, I was interested to see that at Spelman College, one of the historically black colleges, "it is made clear to all incoming students that Spelman expects each one of them to succeed.... There is never the negative, unspoken undertone that one may not succeed.... The higher the standard, the higher the expectation, and the more the students know what is expected of them, the more they are likely to achieve."

Among the practical suggestions offered in the proceedings is that senior women and minorities should mentor their juniors, and that juniors, particularly in isolated and small departments, should approach established women and minority professionals using online social media, including, for example, email, Linked-In, Facebook, and Skype. A paper on the achievements of the 2009 International Year of Astronomy relevant to this suggestion describes a "cornerstone project" called *She Is an Astronomer*. The project provides online profiles of women astronomers and connects, via electronic media, women mentors with aspiring young colleagues around the globe. One paper arguing for enhanced diversity across the field calls for a unified effort by universities, research centers, national labs, and funding agencies to encourage women and minorities to enroll in STEM (science, technology, engineering, math) disciplines by, for example, offering bridge programs to bright students who have been poorly trained to date. A section of the book gives advice on preparing research proposals for both NASA and the NSF. The latter is amusingly organized into three sections, called "How Not to Get Funded: The Fast Path," "How Not to Get Funded: The Slow Path," and "Conclusion and What to Really Do!" Another section endorses the usefulness of networking events and career workshops such as those at the meeting, which give early-career women the chance to share problems and strategies among themselves and also to learn from senior women how they dealt with the challenges that faced them early in their careers, including how they succeeded in job negotiations.

An orphan section toward the end of the book, called “History,” surprised me by its contents. Not only did I learn of two astronomers of the ancient world of whom I had never heard, Enheduanna and Aglaonike, but I also had the chance to read an updated version of a paper originally published in Science in 1986, by esteemed Carnegie Institute of Washington astrophysicist Vera Rubin, now in her eighties, who did pioneering work on the galaxy rotation problem. Her essay, “Women’s Work,” with the discouraging subtitle “For women in science a fair shake is still elusive,” movingly surveys both the history of women in astronomy in the US and some of Rubin’s own struggles as she carved out her professional path from college on. Rubin’s conclusion, though not the last word in this book, can be said to encapsulate the tenor of the meeting as a whole: “women remain scarce at moderate and high level academic positions, and women of color are grossly underrepresented at all levels. Our aim in the future is to make opportunities in astronomy available to all.” That goal is one to which teachers of astronomy around the globe would do well to aspire; indeed it is worthy of being embraced by society as a whole.

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NEWS OF MEETINGS AND OF PEOPLE

SHORT NASE COURSE IN BEIJING

In previous IAU General Assemblies, Commission 46 has organized some courses for teachers in the same venue as the GA. This year, the C46 PG Network for Astronomy Education (NASE) is organizing a day short course for Chinese teachers, which is endorsed by the IAU, in cooperation with Beijing Planetarium. The program includes lectures and practical workshops on the history of astronomy, movements of the Sun and stars, astronomy beyond the visible, and cosmology. The speakers are Julieta Fierro, Beatriz García, Jay Pasachoff, and Rosa M Ros, with the local support of Jin Weijing and Jin Zhu. The session will take place on 24 August in Beijing Planetarium, in English with Chinese translators and Chinese power points to facilitate teachers' participation.

	Basic course 2010	Participant Teachers 2010	Basic course 2011	Participant Teachers 2011	Students involved	Other courses
NASE Group Atlántico (Colombia)	1	51	1	45	29400	4
NASE Group Nicaragua	1	59	1	45	32600	1
NASE Group Lima-Perú	1	34	1	59	25400	
NASE Group Santa Fé (Argentina)	2	83	3	115	48200	12
NASE Group Honduras			1	51	10200	3
NASE Group Panamá			1	48	9600	
NASE Group Paraguay			1	48	9600	

Summary of NASE basic courses in 2010 and 2011.
The courses in cooperation with other entities do not appear in this table.

In 2010 and 2011 the PG NASE organized a set of 14 courses (in Argentina, Colombia, Honduras, Nicaragua, Panama, Paraguay and Peru) and cooperated in other 6 courses more (in Bulgaria, Burkina Faso, Ecuador, Peru, South Africa and Spain). In the 14 basic courses organized, 680 teachers participated and we estimate about 165 000 students received materials and were given tuition (on average we consider that each teacher has 200 students per year). A lot of the participating teachers generated other activities such as competitions, mobile planetariums, experiments, festivals and performances too. Seven NASE groups were created in seven different countries. It is not possible to estimate the number of teachers and students who might receive information by means of activities different to the basic course. We hope that this short course generates some results in China as well.

Secondary and primary school teachers at a workshop in Panamá in July 2011

Secondary and primary school teachers at a workshop in Panamá in July 2011

More details at http://www.iaucomm46.org/web_nase/nase.html
Rosa M Ross

UNAWE CHILDREN DAY CAMP AT THE XVIII IAU GENERAL ASSEMBLY

The IAU is pleased to announce a unique opportunity for children of astronomers attending the XVIII IAU General Assembly in Beijing. In collaboration with the educational programme Universe Awareness (UNAWE) the IAU is organizing a day camp at the conference venue that will allow parents to attend the conference in a family friendly environment combining professional duties and family needs. The day-camp will offer a rich programme of science and cultural hands-on activities, including 2-3 excursions per week to local science institutes (Planetarium, Science Centre…).

Participants
The day camp is addressed to the children of IAU General Assembly attendants, aged 5-11 (date of birth between 20/8/2007 and 31/8/2001). Maximum number of participants each week is 25.

Staff and monitors
The camp is organised by the IAU in collaboration with UNAWE and Sterrenlab. All staff have previous experience with children and science education programmes. Monitors will be recruited among international

students and multilingual staff; groups will be formed based on language and age.

Fee

The day-camp cost per child per week is €200.
This includes

- lunch plus two snacks per day
- monitoring (1 monitor every 10 children)
- material for activities
- 2-3 excursions per week.

Dates

Week I: 20-24 August 2012; Week II: 27-31 August 2012
Children can be registered for week I, week II or both

For more information and registrations

UNAWE info@unawe.org

Sterrenlab
info@sterrenlab.com

THE NATIONAL SYMPOSIUM ON ASTRONOMY EDUCATION IN BRAZIL 2011

The first National Symposium on Astronomy Education (I SNEA) was held at the UNIRIO Campus, Rio de Janeiro, 28-30 July 2011. There were about 135 participants and the event featured about 70 posters and 30 oral communications. Three general lectures, three round tables, and meetings of thematic working groups were also held. In order to provide a diversity of themes, the SNEA program consisted of the following thematic focuses: Formal Education; Non-Formal Education; Teacher Training; Cultural Astronomy; Astronomy Outreach. We await the publication of the Proceedings with abstracts and full papers, which should be available in due course on the Internet, and certainly will show the overall contribution made by the I SNEA.

One of the resolutions taken at the event was the decision about the second SNEA meeting. It is scheduled to take place in São Paulo, USP campus, 24-27 July 2012. As for the first event, the II SNEA has the following objectives: to bring together researchers, students and teachers interested in astronomy education involved in all school levels, and actions promoting discussions about the problems and prospects in the area; to present research papers and further reflections on the possibilities of astronomy teaching, as well as cultural and interdisciplinary aspects; to foster the interaction of research groups working in the area of astronomy education in order to discuss methodologies for medium and long terms policy-making for the teaching and popularization of astronomy in the country, as well as to encourage the eventual establishment of other research groups in the area.

The program will consist of: conferences, round tables and debates; presentation and discussion of research on astronomy education; and establishing a school of teacher education in astronomy intended primarily for teachers who wish to improve their knowledge of astronomy education. The target audience is: people interested in research in astronomy education, including teachers; graduate students in science education (astronomy, physics, chemistry, biology, geosciences), and in education; undergraduate students of science degrees in physics, biology, geography and Earth sciences in education, who are starting research in the area of astronomy education; teacher educators in the areas of natural sciences and/or education, belonging to universities, institutions of higher education and research institutes; and researchers in science education and related areas.

We hope it will be a success and can continue to consolidate the area of astronomy education in our country.

More information may be found at the address <http://snea.if.usp.br/>

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UN/NIGERIA WORKSHOP ON THE INTERNATIONAL SPACE WEATHER INITIATIVE, ABUJA, NIGERIA, 17-21 OCTOBER 2011

Further to the achievements reported at and the negotiations undertaken during the UN/Egypt Workshop on ISWI, organized in 2010, the following Resolution was unanimously adopted by the participants of the UN/ Nigeria Workshop on ISWI, hosted by Nigeria in 2011. First results of the implementation of the following Resolution will be reported at the UN/Ecuador Workshop on ISWI, hosted by Ecuador in 2012.

ABUJA ISWI RESOLUTION

1. The United Nations should lead, with the active support of Japan and relevant scientific organizations, an international effort to establish an International Centre for Space Weather Science and Education in an existing national educational and research institution. The Space Environment Research Center (SERC) at Kyushu University
http://www.serc.kyushu-u.ac.jp/index_e.html
Japan, offered to host this Centre.

2. This Centre should grow into a network of national and regional centers, focusing on space weather, around the world – all dedicated to advancement of space weather research and education.

3. The Centre would provide Capacity Building and technical guidance to nations that wish to engage in space weather science and education. Capacity Building consists of three main components:
(i) Training/deployment on instrumentation. Space weather monitoring, for either operations or research, requires continuous data recording. These data come from precision instruments, either on the ground or in space. Such instruments require proper maintenance. Recent reviews did show that the number of individuals skilled for operating and maintaining these specialized instruments is declining on a global scale.
(ii) Training on data analysis. Raw data must be inspected, corrected, calibrated, interpreted, transformed, and archived. Most of these activities require sophisticated software and long-term experience handling this data. Using software demands advanced training for users of the data.
(iii) Education/training on space weather science. With processed and archived data available, the final process is to perform scientific investigations based on the data, and to publish the research findings in the international scientific literature. The ability to perform this final process generally requires a PhD/MSc level education, which can only be provided by supervisors who are experts in the space sciences at university level.

4. Space weather work is roughly divided into two spheres: operational activities, and research plus educational activities. Operational work can be handled by already existing national space related institutions.

Research and education is the domain of advanced research institutions and universities. The Centre, recommended in this *Abuja ISWI Resolution* must be part of such an advanced research institution or university. Moreover, a proven record of capacity building is an essential prerequisite for this Centre.

5. The Centre must be an institution with a proven record in organizing international activities. These activities include space weather schools, space weather workshops, observation campaigns, installation of instruments in different regions of the world, training of instrument host staff and students, and international outreach programmes. The Centre must possess experience in promoting and supporting international programmes such as ISWI.

6. The Centre would cooperate with the UN-affiliated Regional Centres for Space Science and Technology Education, located in India, Mexico/Brazil, Morocco, and Nigeria
(http://www.unoosa.org/oosa/en/SAP/centres/index.html)
and other centres of excellence in space science and technology education.

7. The Centre for Basic Space Science at the University of Nigeria (http://www.cbssonline.com/), Nsukka, Nigeria, offered to act as a Regional Centre for Space Weather Science and Education.

Sharafat Gadimova and Hans J Haubold
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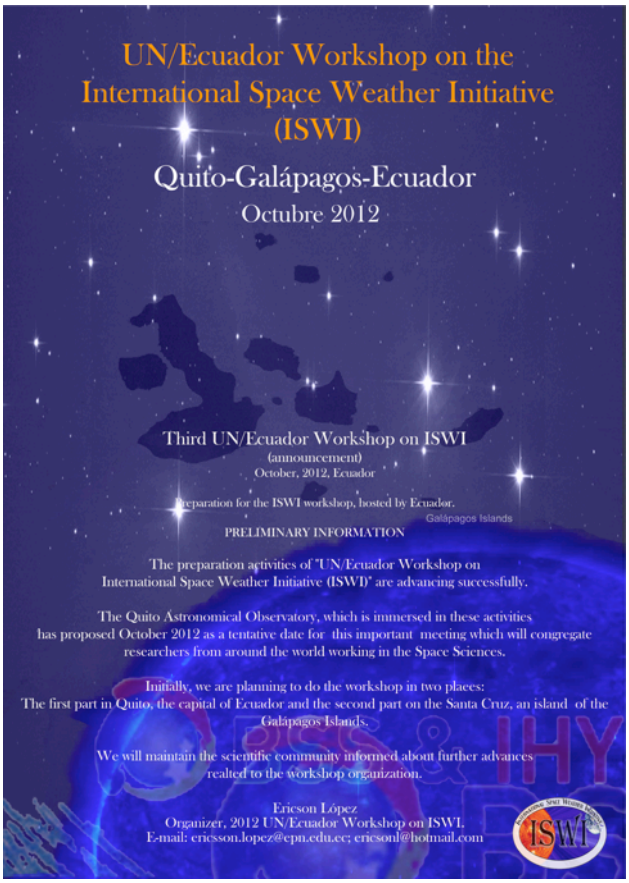
UN/ECUADOR WORKSHOP OCTOBER 2012



Sent to Barrie W Jones by Hans Joachim Haubold
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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

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INFORMATION THAT WILL BE FOUND ON THE IAU C46 WEBSITE

Among the information that will be contained on the IAU C46 website is the following

- Overviews (of C46, in English, French, and Spanish)
- Guidelines (including Programme Groups)
- Resolutions
- Newsletters (including triennial reports from National Liaisons)
- Organizing committee
- National contacts (liaisons)
- Links
- News

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The Organizing Committee also includes a Society Organizing Committee that consists of the Program Group Chairs and Vice-chairs.

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