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

Newsletter 72 – March 2010

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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IN THEIR COUNTRIES

This newsletter is available at the following website
http://www.iaucomm46.org
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.

For the October 2010 issue the copy date is **Friday 15 October 2010**. 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 no larger than about 3 Mbytes each. **DO NOT SEND ANYTHING AS A PDF.**

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 is needed. Only in rare cases is heavier editing necessary.

In this issue I've included two book reviews. This feature first appeared in the October 2009 issue, and attracted no adverse comments, indeed, no comments at all! So, I'll continue to accept book reviews. Reviews must be of books centred on astronomy education or development. If there's such a book that you think is worth reviewing, please send your review to me.

The C46 websites

Recall that in September 2007, the C46 website was transferred from the Open University to the Observatoire de Paris. Though it looked good it was not maintained, and is now defunct. However, our President and others have recently launched a handsome website at http://www.iaucomm46.org. I'm sure you'll join me in thanking our President and the others involved, in this successful outcome.

My mini-website was set up in order to overcome the inadequacies of the Paris website. It 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 URL is http://physics.open.ac.uk/~bwjones/IAU46/.

Back issues of the C46 Newsletter

Since I took over as editor in October 1998, the Newsletters have appeared in March and October in every year.

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

Barrie W Jones
(for contact details see Program Group Chairs and Vice Chairs)

MESSAGE FROM THE PRESIDENT

2010 is the year after IYA2009. This means that we have the opportunity to be actively advancing into the future from this strong base. Of course it is not possible to continue this year with the same level of work as last year. Probably nobody, and no institution, could stand this. Neither can we continue in the same way that we found ourselves before 2009. At present we hope to pursue some of the projects created in 2009 or prior to that date, but from a different point of view.

In general our society has been encouraged to know more and be better informed about some scientific content: astronomy was the motivator. All the people that are working in science communication know very well that astronomy is one of the branches of science which is easier to communicate to society. But, what is the reason? Maybe because astronomy is a visual science. Or perhaps this is because people, from the beginning of humanity, have wanted to know more and more about the Universe. In any case, astronomy has the advantage of connecting to a general audience easily and in a better manner than other more abstract sciences.

Now it is the moment to make contact with governments in order to develop more astronomy facilities in the countries where they do not exist and to increase the infrastructures in other countries. The Program Group for the Worldwide Development of Astronomy (PGWWDA) is planning 6 visits this year: Senegal, Tajikistan, West Africa, Philippines, Panama, Costa Rica and Angola.

Now is the moment to make contact with governments in order to introduce more astronomy in the curricula of students at all levels. Teachers are more motivated and this is an important asset for us. I would like to mention a phone call that I received yesterday. A teacher of kindergarten explained to me that in 2009 they organised a plan on astronomy for the full year. It was the first occasion that they put into effect such a plan. Each child had his/her star. They made drawings and played with the names. Their parents were also involved in a festival with a theatre presentation. They explain tales to their children and the full group organised a night observation for the children who are **1 and 2 years** old. After this wonderful experience they decided to continue for this year because it was especially motivating in their school activities.

The new PG NASE is planning to organise a course in Colombia, Nicaragua and Argentina and give support to continue with our presence in Ecuador and Peru where the NASE pilot course took place last year in cooperation with UNESCO.

Commission 46 has two natural channels to communicate what we are doing in the different PGs and projects after IYA2009: the newsletter and the website.

For long time, Barrie Jones has been doing excellent work with our Newsletter. We have an updated website which is active form last January. I would like to invite all members of Commission 46 to participate in both channels of communication. It is important to show what we are doing and the website and the newsletter are the natural manner to do it. Contact Barrie Jones and Rosa M Ros for showing your good work related to Education and Development.

The newsletter and the website are a resource for all of us. Use both of them to explain what you and we are doing for the Astronomy after IYA2009. Participate in them!

Rosa M Ros
(for contact details see Organizing Committee of Commission 46)

TELESCOPES FOR SCHOOLS
An initiative from the UK's Society for Popular Astronomy

The Society for Popular Astronomy (SPA) is a UK-wide society for amateur astronomers, with almost 3000 members. The SPA wanted to do something significant for IYA2009, and thought it was important to help schools maintain the interest of their pupils in science through astronomy, so it decided to mark IYA2009 by sending 1000 telescopes to secondary schools in the UK. The project was aimed particularly at the 11–14 year old age-group because we found (in visits to schools) that children at age 11 are very often interested in astronomy, but by age 14 other interests have crowded it out (and in science too). A small working group was set up in April 2007, which guided the project from the initial idea to the competition judging for Moon-related artwork at the end of 2009.

We identified several concerns which we addressed in executing the project. We wanted a cheap telescope with reasonably good quality optics, lightweight, robust and relatively easy to put together (since it would need to be stored away after each use). We found a 70mm refractor supplied by Phenix in China, and a small company in the UK (Sky's the Limit) which would organise the import and distribution of the 1000 telescopes. It came complete with a tripod and several eyepieces. We approached the Science and Technology Facilities Council (STFC) in the UK, and they agreed to fund the purchase and distribution of the telescopes. We thought the teachers would (usually) need information about putting the telescope together, finding a suitable place to site it, and guidance on how to use it. We worked with a small company in the UK (Trilby Multimedia), who produce educational material for schools (and employed several amateur astronomers), to produce a DVD to distribute with the telescope. The DVD contained a lot more than just the instructions, for example, interviews with astronomers of different ages, from Noah a 14-year-old SPA Young Stargazer, to Sir Patrick Moore. Working with teachers, additional information was put on the DVD: a lesson plan was drawn up showing what could be done in several lessons; information sheets were produced on astronomical topics such as black holes and how a star evolves; and sketches provided of constellations showing where interesting objects were located. We approached the Royal Astronomical Society (RAS) and they agreed to fund the production of the DVD. We added a 'Moonwatch' area to the SPA website, so that teachers could find out 'what was up' when they prepared to use the telescope, and we organised three Moonwatch periods in March, October and November 2009. We also organised a competition for school students aged from 5 to 18, for artwork inspired by the Moon (attracting over 200 entries).

Mandy Bailey giving William Brookes school their telescope

The project was a huge success, thanks to the enthusiasm of the teachers. We distributed 918 telescopes to schools (around one-quarter of UK secondary schools); the rest were given to STEMPOINTS in the UK who will loan the telescopes to schools for specific projects. Many of the schools (up to one-third) are setting up, or have set up, astronomy or science clubs. Many schools told their local newspapers when they received their telescope, and had a feature in the paper. With Steve Owens' help (the UK IYA2009 coordinator) we evaluated the project via an on-line survey using SurveyMonkey, after the Spring Moonwatch and the Schools Moonwatch. Over 85% of the schools who replied to the survey said the telescope was a valuable addition to their schools' resources. Around two-thirds of the schools had used it more than five times; one teacher said they had lost count of the number of times they had used it, another teacher said it had been used once at school, and then pupils took it home for a weekend each, to enjoy with their families and friends. Apart from the anticipated problems with the weather, around half the schools had used the telescope to look at the Moon, but many of the teachers also observed planets, the Orion nebula, stars and star clusters.

Robin Scagell's photograph of a girl at an observing evening

The SPA offered to help schools find a local astronomer to support their observing – most did not need it. As might be expected, many of the teachers who signed up to the Telescopes for Schools project already had some interest in astronomy, or knew someone who would help. One teacher said that as soon as the SPA telescope arrived, other teachers and parents brought in their own telescopes, which prevented queues building up when they had an observing session. The telescopes were sent out to a very wide variety of schools, including a school for children with special needs where the teacher commented that it made the sky and Moon feel more real to the children. Another telescope was sent to a school which works with disruptive children, and they said that the children really appreciated being 'given' something. One or two schools had used the telescope during open evenings so that many more children (and their parents) had an opportunity to look through the telescope. Even the experience of looking through the telescope during daylight, to see wildlife or distant objects magnified, excited the children. We estimate maybe 25 000 to 50 000 children have looked through one of the telescopes, and based on my own experience most probably said "wow"!

Helen Walker
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INTERNATIONAL OLYMPIADS, ASTRONOMY & ASTROPHYSICS

1 Introduction

There are many type of activities can be done in popularizing astronomy, such as public lectures, star parties, visit to observatories etc. One of them is a competition-type activity. This type of activity has some advantages, when a country team wins medals, or prizes, then usually journalists are easily attracted to report it in newspapers, magazines, on television etc. Frequent media coverage is effective in raising interest in astronomy among school students, also attracting the country's government attention. Having similar concern on astronomy education, five countries, Thailand, Indonesia, Iran, China and Poland agreed to establish the International Olympiad on Astronomy and Astrophysics (IOAA).

2 IOAA Organization

After the establishment of the IOAA organization, in Bangkok, Thailand 2006, Thailand held the first IOAA in Chiang Mai, Thailand, 30November–09December 2007. The second was in Bandung, Indonesia, 19-28 August 2008, and the third in Tehran, Iran, 17-26 October 2009.

The IOAA is an educational activity in astronomy for high school students. Any country in the world can participate in the event, by applying to the host country of the current year's Olympiad. The main aim of the Olympiad is to enhance the development of international contacts among countries in the field of school education in astronomy and astrophysics. Such contact is important to share ideas and experiences, and enhance improvements in the field.

The headquarter of the IOAA is at Chulalongkorn University in Bangkok. The officers of the IOAA are a president and a secretary. They are elected by the International Board, the highest decision making body, for five year terms. The International Board consists of the current year team leaders of the participating countries, a chairperson appointed by the local organizer, the president and secretary. Observers and an academic team of the host country can attend the International Board Meeting but have no voting rights.

Each IOAA is organized by a local organizing committee (LOC) formed by the host country astronomical community. The LOC is responsible in preparing the budget, the draft of the problems, meetings, program, accommodation, excursion, transportation, proceedings etc.

3 Activities in IOAAs

The participants of a country are five high school students under 20 years old. The newly graduated high school students are still allowed to participate provided they graduated in the year the Olympiad is held. Two astronomers or astronomy educators competent in solving astronomical problems lead the students as team leaders, and become members of the International Board of the Olympiad. Besides the students and leaders, it is possible for a country to send observers, provided they pay for accommodation, food, and travel.

The financial principle for supporting the IOAA activities is as follows. The travel expense to the airport nearest to the venue is paid by the participating countries. All of the other costs incurred from the day of arrival until the day of departure is covered by the host country government. Participants and leaders (except observers, visitors) pay no participation fee. Within five years before participation, a country should declare its intention to be the host for a future IOAA. A country that refuses to organize the Olympiad may be barred from participation by International Board.

In the IOAA events, the main activities are the competitions; the others are International Board meetings, excursions, lectures, workshops etc. The competitions are divided into two parts, theoretical and practical. In the theoretical parts, fifteen short and two long questions are to be answered by the participants in five hours. The practical parts consist of observational and data analysis. In the observational part a few tasks are given to the participants to observe celestial objects and answer a few questions based on their observations. In the data analysis part, normally two astronomical data analysis tasks are provided to be solved in four hours.

Problems and tasks are prepared by the academic team of the host country, which consists of astronomers and astronomy educators. The problems and tasks are then presented to the International Board during the International Board Meeting (IBM). The board then reviews the problems, makes some corrections when necessary. When a problem is rejected by the board, the host academic team presents a new problem. The problem set given to the participants is the set which is approved by the IBM and translated by the team leaders into their own languages.

The students' work is checked and marked by juries from the host country, based on a marking scheme. The team leaders review their students work based on the same marking scheme. and compare with the marks given by the juries. When there are differences in marking, the juries and team leaders meet in a moderation session to decide the final mark for each question.

The final scores are then calculated using the formula 60% theoretical and 40% practical scores. Based on the final score, the medal distributions are decided using the following rule. The mean scores of the top three participants are regarded as 100%. Gold medals are awarded to participants who get total scores of 90% or more, silver medals for those who get 78%–90%, bronze medals for those who get 65%–78% and honorable mention certificates for those who get 50%–65%. In this way the participants get medals not by defeating other participants, but by their achievement.

Besides the individual competition, there is also a team competition, and there will be a prize for the best team. The host country will prepare the problems and design the system for team competition.

In the last IOAA, 89 students in 21 teams from 20 countries participated, that is, Iran (two teams), Bangladesh, India, Sri Lanka, Thailand, Indonesia, China, Brazil, Serbia, Poland, Lithuania, Bolivia, Romania, Kazakhstan, Cambodia, Korea, Slovakia, Greece, Belarus, and Ukraine.

Participants of the third IOAA photographed with the
Minister of Education of the Islamic Republic of Iran, photographed by Mochamad Irfan

4 Support from Governments and the IAU

All of the first three IOAAs were supported financially by the government of the host country. The first IOAA was closed by the Minister of Education of Thailand; the second was opened in the Presidential Palace by the President of the Republic of Indonesia. The third IOAA was opened by

former foreign minister and adviser to the supreme leader of the Islamic Republic of Iran, and the participants got a chance to meet the President. These facts show the importance of the government role in the hosting of the IOAA. In the long term, we can expect more government support for astronomy and astronomy education in the countries which participated and hosted the IOAA in the past.

The IAU has also declared its support for IOAAs and it will become one of the IAU commission 46 activities. The Olympiad announcement will also be put in the relevant IAU publication. IAU member countries are welcome to send a team to participate in an IOAA. It is recommended that new participating country send observers first before sending a full team. However, in the first years of IOAAs, in order to popularize the Olympiad, any country can send a full team. Interested countries can visit http://ioaa.info/ioaa2007/

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ASTRONOMY COURSE IN MADRID FOR UNIVERSITY TEACHERS

In the Spanish National Research Council (CSIC), in Madrid, a Symposium organised by the IAU and the International Mathematical Union took place from 23-27 November 2009. The educational session was organised with the support of Commission 46. George Miley, IAU Vice-president, participated in this session and presided over the closing session of the Symposium. The Proceedings will be published in the American Institute of Physics, AIP

As a satellite component of this course (Symposium) a concurrent course (financed by the EU) was organised. The European Association for Astronomy Education (EAAE) and the IAU presented a course on astronomy education, Adventures in Teaching Astronomy. This was a pilot course organised as a joint venture between the EAAE and the IAU. The course has started on 26 November and finished on 01 December 2009.

The opening session of the Symposium was followed by a general lecture presented by George Miley, who explained the future plans of the IAU for the decade 2010-2020, based on the achievements of IYA 2009.

After the general lecture, participants made their introductions to each other. In total there where 35 participants, mainly secondary school teachers, from 13 countries (Bulgaria, Finland, France, Germany, Italia, Latvia, Poland, Portugal, Romania, Spain, Sweden, Tunisia, and the UK). The presentations were followed by a poster session where the participants could present their work on astronomy teaching that has been developed in European schools.

The specific contribution of the IAU to this course was the provision of the speakers for the general lectures. It was a special luxury that Magda Stavinschi, Jay Pasachoff, John Percy and Julieta Fierro presented lectures in the course. The special opportunity to organise this course coordinated with the Symposium, offered this special opportunity. Of course. the teachers enjoyed themselves greatly on this pleasant occasion. Other IAU speakers were Claus Madsen from ESO and Rosa M Ros the chair of the course.

Magda Stavinschi, of the Astronomical Institute of the Romanian Academy, presented a general lecture called Astronomy Heritage, an Important Tool for Education, where the topic of scientific literacy and the importance of astronomy to this issue was debated.

Julieta Fierro, of the Instituto de Astronomía de la UNAM, México, presented a general lecture on South American archaeoastronomy called Astronomy in the Aztec and Maya Land.

A Group picture in front of the CSIC main building

A group of participants

From left to right. Julieta Fierro, Jay Pasachoff, Rosa M Ros and Naomi Pasachoff in front of the Residencia de Estudiantes in the CSIC

Next up there followed a general lecture by Jay Pasachoff, from Williams College, USA, The Transits of Mercury and Venus and their Implications for Exoplanet Transits and the Kepler Mission.

The course then proceeded with a general lecture delivered by John Percy of Toronto University, Canada, Celebrating Galileo and the International Year of Astronomy2009 in your classroom.

Other speakers were from the EAAE and they presented a set of 10 workshops with very practical activities that teachers can use directly in the classroom. A group of different short presentations, eight in total, and a poster session as well as working groups sessions to discuss the current situation in Europe concerning astronomy education and the fruits of the IYA2009 for the future, were among the full list of activities that took place in the course. An observation session was organised too, but the sky quality is not very good in Madrid and in particular it was a cloudy week during the course. The visit to the Madrid Science Museum, Cosmocaixa, and the Conference dinner in the Residencia de Estudinates of CSIC and its tapas was the final enjoyable event in Madrid. The Residencia was a very special site at the beginning of the 20th century. It was the residence in which such luminaries as Federico Garcia Lorca (poet), Luis Buñel (movie director), Severo Ochoa (researcher) and Salvador Dali (painter) studied.

The EAAE has a great deal of experience organising Summer Schools course from 1997 until now. In several editions the course has been organised in cooperation with ESO. The EAAE from the beginning has had a fruitful cooperation with ESO in different events such as Summer Schools and other projects such as Astronomy On-line, Transit of Venus, and Science on Stage.

At present the EAAE is organising several projects (www.eaae-astronomy.org), for instance the Eratosthenes experience redone by schools including videoconferences with Alexandra and Aswan on 21 June 2010.

Practical activities in a working group

This pilot course in Madrid has initiated the beginning of a new period of joint courses involving the EAAE and the IAU. In each course the IAU contribution will be by means of their members in the country where the course take place. At present we are organising two courses for this summer. In Bulgaria the course is organised in Varna 01-05 September in cooperation with the Bulgarian Astronomical Society, the Ministry of Education and Science, and the Nicolaus Copernicus Observatory. In Spain (Cadiz, 13-17 September) it will be in cooperation with the Spanish National Distance University, the Royal Institute, and the Observatory of the Army of San Fernando. Both courses have been planned with the objective of repeating them every year in a different city of the country.

Rosa M Ross
(for contact details see Program Group Chairs and Vice Chairs)

2010 CALENDAR: WOMEN ASTRONOMERS WHO MADE HISTORY

Jay Pasachoff has pointed out the existence of a calendar for 2010, Women Astronomers Who Made History. It can be downloaded at http://www.sheisanastronomer.org/index.php/downloads/calendar
In the opinion of our President, Rosa Ros, “it is good work”.

Barrie W Jones
(for contact details see Program Group Chairs and Vice Chairs)

UNITED NATIONS PROGRAMME ON SPACE APPLICATIONS

The newly printed brochure of the United Nations Programme on Space Applications that also covers UNBSSI (BSS+IHY+IYA+ISWI) and the UN-affiliated Regional Centres for Space Science and

Technology Education in Brazil/Mexico, India, Morocco, and Nigeria, is now available. See http://www.unoosa.org

See also Space Initiatives in the Framework of IYA2009 at
http://www.astronomy2009.org/news/updates/817/

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BOOK REVIEWS

HEAVEN'S TOUCH: FROM KILLER STARS TO THE SEEDS OF LIFE
How we are connected to the Universe

James B Kaler, (Princeton University Press, Princeton, 2009). Hardback, xii + 250 pages, $24.95 ISBN 978 0 691 12496 4 5245

Perhaps the thing I like least about James Kaler's otherwise very enjoyable and informative book is its title, Heaven's Touch. While its subtitle does clue us in to his thesis, I think a book shouldn't have to rely on the subtitle to convey its subject. In the preface, Kaler spells out the theme, that "we are directly connected to the heavens, literally to the entire Universe. Hardly alone and isolated – we the Earth, humanity – are under the constant influence of the cosmos, from tides to solar magnetism to asteroid collisions to 'killer stars' "(xi), and reminds us regularly that "everything is connected to everything else. Even then to us" (165). As I thought about what I might have chosen to call the book, the perhaps hackneyed term 'cosmic connection' came to me. Entering those words into Google, however, I discovered that a book by that title by Jeff Kanipe, The Cosmic Connection: How Astronomical Events Impact Life on Earth, was published a couple of years ago by Prometheus Books. While I haven't read that book, the reviews and publisher's materials about it suggest that it covers much the same territory as Kaler's. Nonetheless, I come to sing the praises (and point to the minor flaws) of Kaler's achievement, not to compare it to Kanipe's.

Kaler is clearly a master communicator and educator. The winner of the 2008 Education Prize presented annually by the American Astronomical Society, Kaler has also been honored for his outreach activities and 'excellence in public engagement'. He seems to have a clear idea of who his readers are likely to be and engages them directly in the journey on which he takes them: "a tour from Earth and Moon, through the Solar System, and out to the far reaches of space, all of which touch us in a remarkable variety of ways" (xi). In Chapter 5, for example, The Accidental Asteroid, in explaining natural resonances, Kaler instructs the reader, "Go to the park. Put your youngster or friend on a swing" (100), implying that the reader is a parent or young adult. He peppers his discussion with little practical hints for how the reader can visualize various ideas. With regard to angular momentum, for example, he advises us to "Tie a rock to a string and whirl it in an 'orbit' about your head. The rock's angular momentum is the product of its mass, its velocity, and the string's length" (37).

Readers of the newsletter of IAU Commission 46 are probably aware of an ongoing debate in astronomy education about the relative merits of the 'traditional' astronomy approach – which emphasizes topics like lunar phases, the causes of seasons, and naked-eye astronomy – and the 'contemporary' astronomy approach, with its emphasis on exciting new developments. Kaler melds the two approaches, lingering perhaps longer than some readers might like on phases, seasons, and celestial mechanics in general, but hardly at the exclusion of modern, exciting developments. And even when he focuses on celestial mechanics, he usually finds something novel to convey, and does so in such an energetic way that the reader whose eyes may have glazed over is likely to awaken enthusiastically. Take, for example, this nice passage from his coverage of solar eclipses: "We live in a special time in which the Moon's angular diameter of one-half of a degree is almost exactly that of the Sun's. . . . As a result, about twice a year, the Moon crosses exactly in front of the solar disk to give us a solar eclipse that allows the study of the outer solar layers. As the Moon moves away from us, its angular diameter is becoming smaller. About 100 million years from now, at its very greatest it will have shrunk to that of the Sun, after which total solar eclipses will be impossible. So enjoy them now!" (38).

Vivid writing that touches the reader personally is Kaler's strong suit in general, and nowhere more so than in his coverage of dying stars, the research field in which he has published over 120 papers. After explaining that "only the rare high-mass" stars create "the vast majority of cosmic rays" when they explode at the end of their lives, Kaler describes the after-effects of the collisions caused by cosmic rays that "smack into Earth's atmosphere": "The energies of attack are awesome. A speeding cosmic

ray particle does not get very far into the upper air before it encounters a nucleus of nitrogen or oxygen, shattering it into a mess of debris that hammers yet more nuclei, whose debris smashes more, and so on, as a shower of particles the width of a sports stadium rains to the ground, the original cosmic ray long lost. You are sitting in such a shower, maybe more, right now" (147).

Kaler is also a master of sentences with a poetic, almost biblical-sounding, sonority, as in "Our senses are limited, and our life on Earth short compared with the flow of celestial time, both of which veil many of the remarkably varied ways in which the heavens directly interact with us. Indeed, life itself would be impossible without all these direct interactions" (18). He seems to be no stranger to poetry, with echoes from Byron's Childe Harold's Pilgrimage in his description of tides: "They – the tides – are on Earth, but not of Earth, as their production lies in the heavens, which reaches out to touch our world"(18); two direct quotations from Updike's Cosmic Gall in his discussion of neutrinos (47, 145); and a nod in the direction of Robbie Burns and his poem For a' That and a' That in the section titled 1054, 1572, 1885, and A'That (178) in his discussion of supernovae.

Far from highfalutin, however, Kaler's writing can be both comfortingly homely and downright funny. I love the way he compares "the vast majority of stars" – those "with masses much under 90 percent solar" – to "dim little bulbs" (155), for example, and the way he describes the Sun as "boiling like a pot of oatmeal on a stove" (51). And how can the reader suppress a smile or even a belly-laugh when coming upon this passage: "Thank goodness for the Romans. Their numerals so nicely lend themselves to the naming of Important Things, from Stars to Superbowls" (180). Or this one: "Stop reading for the moment. Get some exercise by throwing a ball in the air. Under the action of gravity (you are still reading?)" (133).

Kaler also uses humor to advance his thesis that life on Earth is connected to the workings of the cosmos in ways we may not be aware of. In Chapter 7, for example, Kaler asserts that without cosmic rays "life and laundry would not be the same," then playfully asks, "Laundry?" (146). The explanation of the connection between cosmic rays and laundry doesn't come for nearly twenty pages, but Kaler packs so much passion into the writing that the wait is hardly noticeable. It turns out that boron salts, or "borax, which is a prime ingredient for laundry and hand soaps" (165), "are products of CR collisions that made their way to Earth through the collapse of an interstellar cloud. Think about that next time you wash clothes" (166).

Aware, however, that human beings are just as apt to assign connections where none exist as to miss connections that might not be apparent, Kaler makes use of humor to warn us against making false linkages. He begins Chapter 6 by describing the havoc he and his colleague Lew thought they had inadvertently wreaked with the small electric chainsaw Lew gave Kaler. Testing it out in the office, they mistakenly assume they have caused a power outage affecting "the whole north end of *campus*" (120). Kaler drily comments, "What power we wielded with a simple chainsaw. With a larger one we might conquer the World!". It turns out, however, that this story is a way of teaching us the lesson behind the Latin phrase, 'Post hoc, ergo propter hoc,' or 'after this, because of this'. Their hybristic assumptions notwithstanding, the power outage was not connected at all to the electrical activities of Lew and Kaler, though it might have been caused by the traditional 'squirrel in the transformer'.

Among the many things I like about Heaven's Touch is that, as scary as some of the cosmic scenarios Kaler depicts may seem, the book's goals – as opposed to those of some cable-channel science documentaries with scary background music – are to inspire and inform rather than intimidate. For example, after telling us that the right question isn't whether giant asteroid impacts will occur again – they certainly will – but rather "what we can do about the problem" (116), Kaler goes on to suggest a variety of creative approaches (117). He concludes the penultimate chapter in a reassuring way: "Rain, snow, storms, bring disaster to us. . . Yet without the storms, we would have no life at all. Stars and supernovae are no different. While they have the potential to bring catastrophe, they too bring life. We would not be here without them. The balance between creation and destruction seems to be just right" (222). The final chapter continues to press home the reassuring message: "Leave the disasters behind"

(223); Heaven's Touch "can be destructive, to be sure, but it's also creative. Without it there would be no life at all" (239).

Although I am clearly a fan of this book, it is not without some minor flaws. Members of the baby-boomer generation will enjoy its popular culture references, but I'm not sure what younger readers will make of little details that charm me, like the sly nod to Madonna's 1985 film in the assertion that "After a few hundred years of desperately-seeking-ozone, we can relax" (195), or to Camelot, Lerner and Loewe's 1960s musical, in the comment that "for a brief, shining moment, the expanding, cooling Universe passed through the temperature of a stellar interior" (224). I didn't check the index extensively, but I noticed that at least three pages in the text that deal with Kepler (180, 186, 196) aren't listed under his entry. It's too bad that there wasn't a bigger budget for illustrations; even though the choice of photographs is excellent, I regret that they are all in black and white. Finally, a publisher as renowned as Princeton University Press should be sent to time-out for not catching in the proofreading stages the mis-rendering of the world's most famous equation, $E=mc^2$, on two of the three occasions where it is used, where a capital is improperly substituted for a lower-case *m* (6, 45), not to mention the embarrassing misspelling of the French term for death blow, which appears as "coup de gras" (116) instead of *coup de grâce.* These issues notwithstanding, I applaud Kaler's achievement and recommend his book to teachers of astronomy and to their students.

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THE ASTRONAUT'S COOKBOOK: TALES, RECIPES, AND MORE

Charles T Bourland and Gregory L Vogt, (Springer, New York, 2009). Paperback, xi + 219 pages, $29.95 ISBN 978 1 4419 0623 6

I will admit that my first reaction upon noticing The Astronaut's Cookbook on display in the Springer booth at the January 2010 American Astronomical Society meeting in Washington, DC, was skepticism: why would anyone willingly subject Earth-bound people to recipes devised for spaceflight, and what other reason could there be for such a book? It turns out that I was only partly right; the recipes are, indeed, beside the point, but there is a lot of interesting information to glean from this one-of-a-kind volume. The book will be of especial interest to middle-school students and their teachers, and should be made available for purchase in gift shops at science museums, where parents will be able to buy it.

Middle school is a time when children become interested in career possibilities, and I admit to learning from this book that NASA careers are much more varied than I had thought. We learn on page xi that Charles T Bourland, one of the authors, "spent 30 years at the NASA Johnson Space Center developing food and food packages for spaceflight," while his coauthor, Gregory L. Vogt "has been . . . an education specialist with the Astronaut Office" at the same center. I also learned that 'space food' is one of the branches of nutrition science. Children will also be interested to read the Meet the Astronaut sidebars that appear throughout the book, which will instruct them in the kinds of educational backgrounds different astronauts have had.

In reading through the book I compiled five pages of notes of interesting and useful things. I learned about: the history of the space program; about the challenges of microgravity for food storage, preparation, and consumption; and about various physiological issues related to food preparation and consumption in space. Although most of the academically valuable material is in the introduction, where we learn, among many other things, that cooking isn't permitted in the closed environments of spacecraft, where toxins in smoke would present "a serious health hazard" (6), I noted at least one worthwhile educational tidbit per chapter in the nine chapters that followed (devoted to breakfast, snacks and appetizers, soups and salads, bread and tortillas, vegetables, desserts, beverages, and future space food), and often many more. I came across for the first time the word 'lyophilization,' an impressive synonym for freeze-drying, the process that removes moisture from food (145). I learned

that Tang, the space beverage everyone has heard of, was used to mask the flavor of the water produced in fuel cells as a byproduct of electricity generation (167). I also discovered two reasons why shrimp cocktail is the most popular food on NASA space menus: once water has been added back to freeze-dried shrimp, it is hard to tell that they have undergone lyophilization, and by kneading the package to which they have added chilled water, the astronauts are able to dissolve the dried cocktail sauce included with the shrimp (47).

Especially since the book seems most suited to younger pupils, it is unfortunate that it is not free of grammar errors and typos. The Astronaut's Cookbook is, however, 'print on demand,' so Springer should be able to correct the errors in all new copies. In Chapter 6 we read of Skylab 3 astronaut Jack Lousma, the tallest and heaviest among the crew, that "his caloric requirements were greater than his crewmates" (84). "Crewmates" should, of course, be followed by an apostrophe, to clarify that we are talking about his crewmates' caloric requirements. In both Chapter 7 and Chapter 8 there is a shameful error that should have been picked up in proofreading. The first American astronaut in space was Alan B Shepard, not Shepherd. Nonetheless, students will doubtless enjoy the space bathroom history included in the book because of its association with Shepard. I myself was enchanted by NASA's toilet-related euphemisms, including UCD (urine collection device) and WCS (waste collection system), and was intrigued to learn from Figure 7.2 that to keep themselves from drifting away from the toilet seat, Space Shuttle crew members have to attach themselves to it with levers, switches, and a spring-mounted thigh bar (123).

With the announcement of the Obama administration's budget plans to cancel the Constellation Moon program and to nix construction of the Ares and Orion space vehicles in favor of turning launches over to private contractors, some of the introductory material to the final chapter, Future Space Food, is probably out of date. Nonetheless, this chapter contains some valuable information, assuming that NASA does go ahead with a Mars mission, as Charles Bolden, the top NASA official has indicated it will. For one, the food system for a Mars mission will necessitate extending the shelf life of the food onboard. In addition, since Mars missions will take astronauts beyond the Van Allen radiation belts, the food "will have to be resistant to degrading due to exposure to radiation" and will also have to "provide extra antioxidants to help counter the effects of radiation on the crew itself" (180).

Students and educators are likely to be interested in the several Internet Resources on Space Food and Nutrition provided in the last of the three appendixes to the book. The Astronaut's Cookbook not only validates the claim made in the introduction that "Space exploration has fundamentally changed our lives, from the classroom to the marketplace to cyberspace" (3) but should also prove to be a valuable classroom and household resource in its own right.

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NEWS OF MEETINGS AND OF PEOPLE

ASP 2010 AUGUST MEETING, TWO CONFERENCES FOR EDUCATORS

As you are planning your 2010 calendar and budget, we wanted to let you know that plans are moving along for the 122nd Annual Meeting of the Astronomical Society of the Pacific (ASP), 31July–04August, at the University of Colorado in Boulder, in one of the most beautiful settings in the USA, and featuring two concurrent 3-day conferences 02–04 August.

- Cosmos in the Classroom 2010: A Hands-on Symposium on Teaching Introductory Astronomy
- Making Connections in Education and Public Outreach (EPO): A Meeting for Those Working in EPO.

You can now sign up to be notified as program and registration information becomes available at: http://www.astrosociety.org/events/meeting.html.

As in previous Cosmos and EPO conferences hosted by the ASP, we will devote much of the time to hands-on workshops, where we can 'practice what we preach'. We will also have panels, poster papers, a 'share-a-thon' room for putting out materials we are proud of, and time for formal and informal networking with people who teach or work in settings similar to yours.

Cosmos attendees will include astronomy instructors from high schools, community colleges, liberal arts colleges, state universities, research universities, and informal science institutions. We especially welcome those who are teaching part time or are just starting to teach.

EPO conference attendees will include scientists, K-12 teachers, university educators, informal educators (e.g. museums, planetaria, parks), public communicators, science writers, and other EPO professionals. All are welcome who work on or support EPO projects in space science or Earth science (including such fields such as physics, astrophysics, heliophysics, planetary science, and astrobiology).

Besides facilitating networking opportunities within each conference's respective audience, the 2010 ASP Annual Meeting will feature plenary sessions aimed at bringing both groups together, and enabling greater dialogue and interactions among all attendees. We will arrange sessions joining instructors and EPO professionals, focusing on what kinds of information and what kinds of materials are most useful in classrooms, and how Astro101 and EPO professionals can collaborate to their mutual benefit. A set of weekend workshops (31 July–01August) will precede the two conferences.

We are working to make scholarships available to educators whose budgets would not ordinarily allow them to come, but these will be limited in number. If you can apply for travel through your own institution, we hope you can pursue that.

A method of proposing sessions and papers will be available at the ASP web site in early 2010. In the meantime, we hope you will start thinking about the kinds of activities you would like to see and do at the meeting. If you have suggestions for interesting approaches for the meeting program committee to consider, please contact one of the undersigned directly.
Andrew Fraknoi (Cosmos Program Sub-committee): fraknoiandrew@fhda.edu
Greg Schultz (EPO Program Sub-committee): gschultz@astrosociety.org

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40 YEARS OF SPACE AGE & BEYOND

Under the International Year of Astronomy 2009 programs, the Royal College Astronomical Society (RCAS) of Sri Lanka organized an innovative program called 40 Years of Space Age & Beyond (FYOSA 09). The program, which was held 8–9 December 2009, consisted of a workshop, Science Fiction (SF) competition, and Exhibition of Apollo 11 Moon rocks. The program gathered more than 6000 visitors which included students, teachers, parents and the general public. The workshop and the SF competition had a participation of 30 schools around the country. It was two days filled with astronomical experience.

Please find the report of the program at http://iya2009.lakdiva.net/FYOSA09.pdf
Alternatively you can see the report with more images at
http://thilinaheenatigala.blogspot.com/2009/12/40-years-of-space-age-beyond-concludes.html
And the FYOSA 09 trailer can be viewed at http://www.youtube.com/watch?v=l5I-SWcefrk

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APRSAF SPACE EDUCATION SEMINAR, BANGKOK 26-29 JANUARY 2009

The 16th Session of Asia-Pacific Regional Space Agency Forum (APRSAF-16) www.aprsaf.org was held in Sofitel Centara Grand Hotel in Bangkok on 26-29 January 2009, which was jointly organized by the Ministry of Science and Technology (MOST), the Geo-Informatics and Space Technology Development Agency (GISTDA) of Thailand, the Japan Ministry of Education, Culture, Sports, Science and Technology (MEXT), and the Japan Space Exploration Agency (JAXA). It was attended by 310 Participants from 26 Countries and 10 Regional and International Organizations. The theme of the APRSAF-16 was Space Applications: Contributions towards Human Safety and Security. Mr F R Sarker, General Secretary, Bangladesh Astronomical Society (BAS) and a Member of APRSAF Space Education and Awareness Working Group (SEA WG), and Mr Muzibur Rahman Howlader, the Chairman of Bangladesh Space Research and Remote Sensing Organization (SPARRSO) participated.

Delegates and members of APRSAF

On 26 January, in the Earth Observation Working Group Meeting, Mr Muzibur Rahman Howlader made a presentation on Flood, Environment and Disaster Management in Bangladesh. On the same day in the Space Education and Awareness Working Group Meeting, F R Sarker made two presentations which included Celebration of International Year of Astronomy 2009 in Bangladesh, the total solar eclipse on 22 July 2009, celebration of World Space Week 2009, and the meeting between astronomers of India and Bangladesh at the border on 21 July 2009, which were highly appreciated by the participants.

The participants at the water rocket launching pad


Posters by junior class students, entered in a competition

During the APRSAF-16 Session Mr F R Sarker and Mr Muzibur Rahman Howlader had a meeting with Mr Eijiro Hirohama, Director, and Ms Takemi Chiku, Associate Senior Administrator of Space

Education Office of Japan Space Exploration Agency (JAXA), who agreed to hold a Space Education Seminar in Dhaka, Bangladesh. In the Concluding Session of APRSAF-16 on 29 January, a formal declaration was made by Mr Surachai Ratanasermpong, the Co-Chair of Space Education and Awareness Working Group, that the APRSAF Space Education Seminar of 2010 will be held in Dhaka. However, the actual date for this Seminar will be announced later after discussions with the Government of Bangladesh.

On 23-24 January, two students from Bangladesh, Usama Amin Jarjis of ICL School, Enayetpur, and Anam Arafat Amit of Maple Leaf International School, Dhaka, led by their teacher M A Sharif, Office Secretary of Bangladesh Astronomical Society, participated in the Water Rocket Launch Contest along with 36 students from 15 countries which was held in the premises of the National Science Museum, Bangkok.

The Bangladesh team. Left to right, Usama Amin Jarjis (student), M A Sharif (teacher), Arafat Amit (student)

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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

Barrie W Jones
(for contact details see Program Group Chairs and Vice-Chairs)

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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Collaborative Programs (CP), UNESCO, COSPAR, UN, ICSU, etc.
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Commission Newsletter and National Liaisons (CNNL)
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