

# NEWSLETTER

*Has some triennial  
national reports*

## IAU COMMISSION **46**: THE TEACHING OF ASTRONOMY

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### MESSAGE FROM THE PRESIDENT

The 1994 IAU General Assembly in The Hague marked the beginning of a new three-year cycle of Commission 46 activity. It is an honour and a pleasure to be your new president. First and foremost, I express our deep gratitude to Lucienne Gouguenheim for her excellent work as president in 1991-94. She carried out her duties with energy, enthusiasm, diplomacy and judgement. At the same time, she continued to contribute to the development of astronomy education in Europe (see page 4) and in her own country, while maintaining her active personal career as a researcher and teacher. Thank you, Lucienne, and best wishes to you!

I also thank the members of the 1991-94 Organizing Committee, especially the retiring members: Leo Houziaux, Cecylia Iwaniszewska, Jay Pasachoff, Bob Robbins and Aage Sandqvist. All of them have made major contributions to Commission 46 over the years. Finally, I welcome our new Vice-President Julieta Fierro, and our new Organizing Committee (listed above). It will be a pleasure to work with you.

**Please see the important notice on page 5 about the electronic version of this newsletter, and send your electronic mail address to both me (percy@astro.utoronto.ca) and to Armando Arellano Ferro (armando@astroscu.unam.mx).**

John R. Percy  
President

**PLEASE CIRCULATE THIS NEWSLETTER!**

## REPORT ON ISYA IN EGYPT, SEPT. 18 - OCT. 8, 1994

Donat G. Wentzel, Astronomy Program, University of Maryland, College Park, MD 20742 USA

The 21st ISYA (International School for Young Astronomers) took place in Egypt, the first and third weeks at Cairo University and the second week at Kottamia Observatory, located in the desert some 85 km east of Cairo. Egyptian sponsors were the Academy of Scientific Research and Technology, the Ministry of Scientific Research, the National Research Institute for Astronomy and Geophysics (NRIAG, Helwan), Cairo University, and the Ministry of International Cooperation. The Director of the School, Prof. R.A. Ghobros, was aided by a Local Organizing Committee in which Drs. S.M. Hassan and M.I. Wanas were particularly active. The IAU supported travel expenses of about \$17,500. The Egyptian costs for hotel, meals, and the meeting were somewhat more.

Four foreign faculty were invited: Dr. Jayant Narlikar (IUCAA, India, cosmology), Dr. Giuseppe Longo (Osservatorio di Capodimonte, Italy, photometry of galaxies), Dr. Michèle Gerbaldi (assistant secretary of ISYA, Institut d'Astrophysique, Paris, stellar spectra), and Dr. Donat G. Wentzel (secretary for ISYA, University of Maryland, USA, solar physics / MHD). After several last-minute changes, the Egyptian faculty were Dr. M.I. Wanas (cosmology), Dr. Mohammed Samir Abu El-azm (spectroscopy on the 74-inch telescope), Dr. A.I. Basuni (variable stars and photometry on the 74-inch telescope), and Dr. S.M. Hassan (star clusters and galactic structure), plus four guest lecturers. The emphasis throughout ISYA was on providing a broad view of astronomy and the related physical sciences.

There were 35 applications (including only 5 from Africa and only 3 women) within ten days of the deadline. The facilities at Kottamia limited us to inviting 14 foreign participants. We invited 14 (including 2 women) from 14 countries, but only 12 came, from Zambia, Nigeria, Algeria, Libya, Bulgaria, Slovakia, Uzbekistan, Azerbaijan, Ukraine, Russia, Greece, and Vietnam. The participants ranged from a student with a recent B.Sc. and observing experience to a few doctoral students and one Ph.D. There were 29 active Egyptian participants (including 8 women), mostly at the M.Sc. level.

The participants on average had a better preparation in both science and ability to speak English than for the last several ISYA. This allowed the scheduling of participants' talks on cosmology already during the first week while Dr. Narlikar was present, with simultaneous very active discussions on solar physics in one group and stellar physics in another. Foreign participants gave brief talks about their institutions, and some participants (6 foreign, 3 Egyptian) gave talks about their research aimed at all the participants. Two observing projects using the 74 inch telescope were each spread over two nights. There was an excursion to NRIAG and cultural excursions in Cairo and from Kottamia. The textbooks brought by the foreign faculty were read eagerly. There was much discussion about acquiring data from abroad and international collaborations. The foreign faculty gained the impression that the Egyptian students feel the strong need to expand their horizons and the available communication facilities.

A sudden change in the university calendar precluded housing at Cairo University. But Dr. Ghobros found a suitable hotel near to both the University and the center of Cairo. Dr. Hassan admirably took care of the many details that become necessary on short notice during an ISYA. In Kottamia this involved the uncertain time of arrival of the daily bus from Cairo bringing some participants, some faculty, and the main meal of the day. The end result was an ISYA that, as some participants said, left the participants with a more creative outlook on astronomy.

## THE SIXTH PARAGUAYAN VLP: DR. MICHELE BOSSI AND STAR PULSATIONS

Alexis Troche-Boggino, Departamento de Física, Universidad Nacional de Asuncion, Paraguay

The sixth VLP course: Stellar Pulsations started last April 7. Dr. Michele Bossi, the instructor, was from Osservatorio Astronomico di Brera, Italy. Eight students attended his course regularly. They met for 90 minutes twice a week at the Department of Physics, Facultad de Ciencias Exactas y Naturales, to the end of June. The number of lectures, practical classes for data reduction and review for the final exam, were 24. Also, some observations through the IAU travelling telescope photometer were held, weather permitting, for at least five nights and not less than three hours each available night. These were at Mr. Eduardo Parini's private observatory, in Caacupe-mí, 25 km from the UNA Campus. Most of the observations were for AI Vel, a Delta Scuti variable star.

Dr. Bossi speaks Spanish quite fluently. We were happy to have an excellent instructor who continued Armando Arellano Ferro's course after a year and a half. It was an advanced level course which emphasized the physics of star pulsations. But, it also contained some review of astronomical instruments (telescopes and photometers) and stellar evolution (to allow some new students to follow along). The second half of the course was dedicated to practical training with advanced data reduction software: the Vanicek method for frequency analysis and some physical discussion of the result, for the observed star.

Dr. Bossi's courses ended on June 29. Four students took the final exam. Two of them got excellent marks, one good and another left the exam. Another four attended most of the lectures and observations but did not come to the exam.

Dr. Bossi helped his students. He showed a well-organized presentation of subjects and a useful set of class notes. These arose from his own experience. I suggested to him to prepare a monograph with these notes which are quite didactic and original. It should be very useful for similar courses and for Latin American students who lack avant garde books of astronomy in Spanish. He said that he would consult with Armando Arellano Ferro and combine their notes to do such a task. These are complementary. These two last VLP instructors showed excellent didactics.

Mr. and Mrs. Eduardo Parini were the hosts for Dr. Bossi and he stayed at their comfortable country house in Caacupe-mí. Nancy Nuñez and her family had shared with Parini hospitality for the guest. They gave him fine attention. Dr. Bossi visited several touristic places in Paraguay and got along well socially. He gave one popular lecture at the University: "How Bodies Move in Space". He showed excellence in explaining interesting facts from Celestial Mechanics with simple math and hand drawings.

Also, credit should be given to CLAF and UNESCO for economic support; to Dr. Luis Berganza, the head of UNA; Lic. Oscar Esquivel, the head of the Facultad de Ciencias Exactas y Naturales; and M.S. Genaro Coronel, the director of the Physics Department, for some fine compliments for the instructor and students. Also to Berta Medina, a science journalist collaborator of ABC newspaper. I would like to thank particularly Lic. Michael Brüggmann who took care of a number of tasks for the course development. Furthermore, he participated at all of the sixth VLP.

## **TEACHING FOR ASTRONOMICAL DEVELOPMENT**

Donat G. Wentzel, Astronomy Program, University of Maryland, College Park, MD 20742 USA

The IAU wishes to support institutions in countries that now have very little astronomy and who wish to expand their astronomy activities significantly. In the past, this goal has been expressed through the Visiting Lecturer Project, which operated in Peru and Paraguay. The revised program aims at a small number of additional countries. The IAU would support primarily the cost of travel needed for this program: travel for visiting lecturers giving a regularly scheduled course, possibly integrated into a university department of related sciences; travel by select advanced students to work in another country; and travel that establishes and advances international collaborations with the host institution. The sponsoring institution would be responsible for other costs such as the lecturer's living costs and for establishing a plan through which astronomy could be maintained after the TAD program ends.

Astronomers are urged to bring the existence and opportunities offered by TAD to the attention of their colleagues in astronomically developing countries. Informal expressions of interest and requests for more information and correspondence should be sent to Dr. Donat G. Wentzel, Dept. of Astronomy, University of Maryland, College Park, MD 20742, USA, e-mail (internet): wentzel@astro.umd.edu, fax: USA (301) 314-9067.

Formal applications will probably be due in December 1995. Decisions will be made by a committee to be chaired by Dr. Derek McNally, University of London Observatory.

## **EUROPEAN ASSOCIATION FOR ASTRONOMY EDUCATION**

In late November 1994, Past President Lucienne Gouguenheim represented IAU Commission 46 at a European Southern Observatory (ESO) workshop on the teaching of astronomy in Europe's secondary schools. She reports that it was a great success, thanks to the very good organization, and the way in which Richard West (former IAU GS and Commission 46 member) conducted the discussions. A "declaration" was adopted unanimously by the 110 participants. When this is in its final form, it will be made available to Commission 46 members.

It was decided to form a European Association for Astronomy Education. The Executive Committee includes Laura Abati (Italy), Anne M. Cohen (UK), James G. More (Treasurer, UK), M. Reichen (Editor of the EAEE Newsletter, Switzerland), D.P. Simopoulos (President, Greece), Roland Szostak (Secretary, Germany), Richard West (Honorary President, Denmark), M. Winter (Denmark), as well as Lucienne Gouguenheim (France). The EC will write the by-laws, and the first newsletter is expected to be published in April. The proceedings of the workshop will be published early in 1995.

## THIS NEWSLETTER GOES ELECTRONIC

The cost of printing and mailing this newsletter continues to rise. At the same time, the pressure on the IAU to reduce its budget continues to rise also. Commission 46 would prefer to expand the circulation of this newsletter. We believe that this can be done electronically. The format will undoubtedly evolve as technology evolves. We have established a working group, co-chaired by Armando Arellano Ferro and Lucette Bottinelli, to develop an electronic newsletter (ENL) for 1995. I thank the WG for taking on this important task. A limited number of paper copies will continue to be printed and mailed to key individuals and institutions which do not have access to electronic mail.

**If you wish to continue receiving this newsletter in any form, please do one of the following: (i) send your name and electronic mail address to me (percy@astro.utoronto.ca) and to Armando Arellano Ferro (armando@astroscu.unam.mx) or (ii) mail me a note confirming that you wish to continue to receive the newsletter, but do not have access to electronic mail. Note that we will not be able to satisfy every request for a paper copy of the newsletter.**

John R. Percy  
President

## LIGHT POLLUTION

The February 1994 (volume 13) of the newsletter *Nikon by Nikon* (Nikon Corporation, Fuji Building, 2-3 Marunouchi 3-chome, Chiyoda-ku, Tokyo 100, Japan) contains an interesting article "Twinkle, Twinkle, Little Star" on light pollution, with many interesting illustrations including a photo of Syuzo Isobe (member of the OC of Commission 46) and of Bisei Astronomical Observatory (see article by Tomokazu Kogure elsewhere in this Newsletter).

Syuzo Isobe has published an interesting paper on "Measurement of Energy Loss Through World Light Distribution at Night", in the proceedings of the UN Indonesia Regional Conference on Space Science and Technology for Sustainable Development, May 17-21, 1993. The abstract is as follows:

"The human is presently using much energy in a form of light which does not shine on only necessary objects to be seen but is also ejected into space without any contribution for human living. Satellite observations at night show a beautiful distribution of light over our terrestrial surface. From our preliminary estimations, we find some correlation between total light observed by the satellite and total energy used in each city. Therefore, to reject unnecessary usage of light, we should measure light distribution at night by satellite observations and will make a proposal."

An interesting link between astronomy and environmental studies!

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E-mailed  
both  
3/9/95

## EXPERIENCE IN TEACHING ASTRONOMY AND ASTROPHYSICS IN THE ASTRONAUTICS CLUB

Ekaterina Yu. Aleshkina, Institute of Applied Astronomy, Russian Academy of Science,  
Zhdanov Street 8, 197042 St.-Petersburg, Russia

1. Introduction. At present the question of the teaching of astronomy is topical as regards the fact that over the last few years astronomy is given no attention in the secondary schools in Russia. The main aim of astronomy teaching for amateurs consists of the creation of the common world-view which is equivalent to a modern state of the science and prevents the spread of different mysticisms such as astrology, etc. The syllabus for amateurs should be constructed taking as a basis the history of astronomy. For 11 years, such an approach has been used successfully in the Astronautics Club in Sankt-Petersburg (Russia).

2. The Astronautics Club. The Titov Astronautics Club in Sankt-Petersburg is a body of senior pupils, 13-16 years old who are interested in the study of research and assimilation of space. The classes in the Club are taken after school. The pupils take theoretical subjects, practical lessons in computer classes and aviation training, sports lessons on acrobatic and trampoline jumps. Among the theoretical subjects there are several aviation, astronautics lessons, astronomy and astrophysics. The knowledge checking is carried out by tests in each subject twice a year. After three years of learning, the pupils write a paper on the topic chosen, and defend it. The education in the Club is a kind of deep vocational orientation and the training for a further education in the higher school.

3. The Astronomy Syllabus. The syllabus consists of 4 main parts: 1) History of astronomy; 2) Astrometry; 3) Celestial mechanics; and 4) Astrophysics. The first part includes 10 topics; each of them is devoted to one period in the astronomy development or to one famous astronomer. After this the classical astronomy connects with the specific name. Both astrometry and apparent motion of celestial bodies connects with Copernicus and celestial mechanics and the laws of planets motion connects with Kepler, etc. For the pupils, 13-15 years old, some mathematical and physical equations are rather difficult to understand and the descriptive side is brought to the foreground.

During all 11 years, towards the end of each school-year, the pupils fill out a form. The questions answered are the following: 1) the most interesting question during the year; 2) the most complicated question; 3) the most tiresome question; 4) what astronomers do you like best of all. From more than 200 forms it can be noted that in most cases the answers to the first and second questions are similar. This fact shows that just those topics which demand large effort for understanding arouse the largest interest. In many forms the Kepler's laws and astrophysical problems belong to these answers. Among the most liked astronomer are Bruno, Kepler, Hubble, Lomonosov, and several ancient Greek philosophers. This fact can be explained by the brilliant talents of these people.

## A NEW TREND OF PUBLIC ASTRONOMICAL OBSERVATORIES IN JAPAN

Tomokazu Kogure, Bisei Astronomical Observatory, Bisei, Okayama 614-14, Japan

1. A New Trend in Japan. In Japan there are about 110 public astronomical observatories, mostly established by cities or towns. The number has rapidly increased in the late 1980's, and in addition, more than 40 observatories at present are equipped with telescopes larger than 50 cm in aperture. This number, however, is not necessarily welcoming for astronomy popularization, according to Kuroda (1993), since telescopes in many public observatories are not sufficiently used. One of the reasons is that most public observatories have been founded by local authorities without having effective advice from professional or advanced amateur astronomers on equipment and instruction. Shortage of supporting staff educated in astronomy is another reason.

From the beginning of the 1990's, a new trend in public observatories has been apparent. First is the construction of new type public observatories which are operated or supervised by professional astronomers and which possess telescopes and instruments capable of astronomical observation in collaboration with researchers. The second is the foundation of the Association of Public Astronomical Observatories in Japan which was organized in 1991 for the purpose of close communication among public observatories. And the third is the PAONET project, which aims at constructing a computer network between major research institutes and public observatories. When the network is running, the latest exciting images on astronomy can be open to the public through a hundred public observatories in Japan. The PAONET has shown its value in the occasion of SL-9 collision with Jupiter in July, 1994, in its test run. Its regular run is expected to start within a few years.

2. New-type Public Observatories and the Future. So far, public observatories have been mostly operated by the people of local authorities for guiding star-watching of citizens. Activities of public observatories have ordinarily been done without collaboration with professional astronomers except on some special occasions. With the increase of the size of telescopes, the role of public observatories becomes widely recognized as the local centers of astronomy, both in physical observations and popularization. The number of astronomers who are interested in such a trend has also been increasing. The construction of new-type public observatories has thus started in the late 1980's.

The first sample is Nishi-Harima Astronomical Observatory which was founded in 1990. The main telescope is a 60 cm reflector equipped with a cooled CCD camera. At present, five staff members including experienced astronomers are working in solar, stellar and galactic astrophysics, besides the activities for popularization of astronomy. The second is Bisei Astronomical Observatory which was established in 1993 by Bisei Town with a 101 cm telescope. A cooled CCD camera, a photoelectric photometer, and a spectrograph are available. These instruments are fully capable of physical observations of stars and galaxies, along with star-watching services for children and citizens. Three permanent and two part-time professional staff are now working in research and popularization, in collaboration with amateur astronomers around the area of Okayama Prefecture. Saji Observatory in Tottori Prefecture was opened in July 1994 with a 103 cm reflector as its main telescope. A CCD camera is attached to the telescope for astronomical observations, and work in research and popularization is now active by five or more technical staff.

In other observatories having moderate or large telescopes, efforts for carrying out astronomical observations are spreading gradually. Cooled CCD cameras are already familiar in many public observatories. Some of them are planning to install photometers and spectrographs on their telescopes. Barriers between amateurs and professionals in observation are thus being lowered with the development of new-type observatories and of close communication connecting public observatories and national or university observatories. These novel trends are expected to be accelerated in future.

**Reference.** Kuroda, T. 1993, Annual Report Nishi-Harima Astronomical Obs. No.3, 46, Present Status of the Public Observatories in Japan.

## **22nd INTERNATIONAL SCHOOL FOR YOUNG ASTRONOMERS**

The 22nd IAU International School for Young Astronomers will be held at the Universidade Federal de Minas Gerais, Astronomical Observatory (Department of Physics-ICEX), Belo Horizonte, Brazil: 9 July - 29 July 1995.

Topics to be covered: stellar astronomy and astrophysics, interstellar medium, galaxies, CCD detectors in astronomy, practical astronomy, teaching of astronomy. Although English and Spanish will be the languages of the school, knowledge of English is essential.

Accommodations of accepted participants will be covered by local resources. Travel expenses will be the responsibility of the participants. A limited number of travel grants will be awarded upon justified request with the application. Applications with a recommendation from the head of the applicant's institution should be received before 10 April 1995, to be sent both to the Assistant Secretary for ISYA, Dr. Michele Gerbaldi, Institut d'Astrophysique, 98 bis Bd. Arago, 75014 Paris, France (e-mail: gerbaldi@iap.fr; fax: 33-1-44-32-80-01) and to Prof. Renato Las Casa, Observatorio Astronomico da Serra da Piedade, ICEX-UFMG, Caixa Postal 702, 30-161-970 Belo Horizonte, Brazil (e-mail: isyabr@oraculo.lcc.ufmg.br or isyabr@fisica.ufmg.br; fax: 55-31-448-5600).



## **ASTRONOMICAL ACTIVITY IN ISLA MARGARITA (VENEZUELA), AT LAST!**

Gonzalo Vicino, Casilla de Correo 10.987, Montevideo, Uruguay

Invited by the La Salle Foundation, an ancient religious order devoted to education in different countries, I went to assess a group of people interested in promoting astronomical activity, centered on two basic points: (i) establishing a planetarium and (ii) the reconstruction of a telescope that may serve as a center of interest for amateurs and perhaps, some day, some serious astronomical research.

The planetarium was a donation to the La Salle Foundation some twenty years ago. It is a small Spitz planetarium with a semi-frontal room with 80 seats and many accessories, such as projectors for landscapes, slide projectors, and so on. The building with its interior projection dome was built just two years ago, and then the Spitz Company proceeded to install the instrument.

My job was to prepare the crew of the planetarium on how to give lectures of this specific kind, and train them in things such as making photographic slides and preparing other materials for future themes. The planetarium is located at the Puntas de Piedra Campus, where a nautical school, a secondary school, and some other technical and educational institutions, and an oceanographical research institute, all belonging to the La Salle Foundation, operate. In the same campus, over the building where the secondary school operates, an astronomical dome houses a 15 inch Cassegrain, constructed by J.W. Fecker probably about 30 years ago. It was a donation by someone, somewhere, and nobody ever installed it. It is placed exactly 25 meters away from the shore of the Caribbean Sea, so you can imagine the tremendous damage made by the salt of the sea.

Throughout my 4 weeks at Isla Margarita I had to rebuild this telescope, that was assembled 15 or 16 years ago, but was never installed nor used. So many years exposed to the Caribbean air have done great damage to many pieces of the telescope, and it was really a titanic job to repair some special gears and accessories. The mirrors were re-aluminized at the Los Andes University Observatory, in Mérida, but some other pieces were irreparably lost, like the eyepieces, the light baffles, the slow-motion mechanism, and so on. Before departing Isla Margarita, I left a complete schedule to acquire new and good eyepieces, and many other accessories to give the telescope new possibilities. I hope this complex Planetarium - Telescope may be useful to create an interest in astronomy in a region where this science is somewhat neglected.

A few days after my arrival in Margarita I had the honour to be founder of the "Sociedad Astronómica Margariteña". An enthusiastic group of not less than 50 people began its foundational activity with a synthetic introductory course of Astronomy for amateurs, given by myself, in which in 5 days, 3 hours a day, we went throughout a wide field of astronomical themes. My poor pupils! I also gave 6 or 7 lectures in different public institutions such as an art museum, a public library, and so on.

It would be desirable that all astronomy educators who have the possibility of visiting Isla Margarita, collaborate with lectures and the donation of books and/or accessories for the telescope and the planetarium. We wish exciting prospects to the Margaritense astronomers!

## TRIENNIAL NATIONAL REPORT

### GERMANY 1991-1993

Johannes Feitzinger, Sternwarte der Stadt Bochum, Astronomisches Institut,  
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One major consequence of the reunification of Germany was that astronomy is now a subject in most of the new countries. In the 10-year old age group (Gymnasium, Sekundarstufe I) astronomy is taught for 2 hours weekly; otherwise an intimate connection with physics is recommended.

Two new schoolbooks appeared: K. Lindner, M. Schukowski, *Astronomie (Lehrbuch für die Sekundarstufe I)*, Verlag Volk und Wissen, Berlin, 1994; D.B. Herrmann, *Astronomie (Sekundarstufe I)*, Verlag PAETEC, Berlin 1994. These school books are supplemented by three more general book contributions, written for the general public: W. Winnenburger, *Einführung in die Astronomie*, BI Wissenschaftsverlag, Mannheim, 1991; W. Winnenburger, *Schüler Duden-Astronomie (Ein Sachlexikon für den Unterricht)*, Dudenverlag, Mannheim, 1989, 1992; J. Feitzinger, *Unterwegs auf der Milchstraße (Die Erkundung unserer Galaxis)*, Franckh-Kosmos Verlag, Stuttgart, 1993.

There is also an increasingly-used pedagogical astronomy journal: *Astronomie und Raumfahrt* (6 issues per year), Verlag Friedrich, P.O. Box, 10 01 50, D-30926 Seelze; Editor: Dr. H. Bernhard. This journal is partly specialised for the astronomy teacher with lecture examples, teaching aids and further education. The connection with mathematics is cultivated. A special issue of the journal "Der Mathematik-Unterricht" is devoted to astronomy (*Astronomie im Mathematikunterricht*, Vol. 39, Heft 2, 1993), also printed by Friedrich Verlag in Seelze.

The German Physical Society introduced a Working Group: Teaching Astronomy (*Astronomie und Astrophysik in der Schule*); Speaker: Prof. Dr. R. Szostak, Wilhelms-Universität Münster, Institut für Didaktik der Physik, Klemmstr. 10, D-48149 Münster. The working group is engaged in the further education of teachers and the didactic of teaching astronomy. Generally two workshops per year are carried out. Also the Astronomische Gesellschaft organizes two teachers' workshops per year.

In Germany, there are now 81 planetariums working; 11 with dome diameters greater than 10 m. On average, more than 2 million visitors per year are counted.

## TRIENNIAL NATIONAL REPORT

### ASTRONOMY EDUCATION IN INDIA

S. Ramadurai, Astrophysics Group, Tata Institute of Fundamental Research,  
Homi Bhabha Road, Navy Nagar, Colaba, Bombay 400 005, India

**1. General Information.** The growth of astronomy in the country is triggered by the increase in the astronomical facilities at both the research and popular level. Opening of new planetaria at new centres contributed to the renewed awakening of the masses in looking at the skies for identifying familiar constellations and planets. The research facilities like the construction of the Giant Metrewave Radio Telescope by the National Centre for Radioastrophysics at Pune and plans

for a new Radioastronomy Centre at Calcutta led to the university community realising the need for formal astronomy education for their students. More than all these are the untiring efforts of Inter-University Centre for Astronomy and Astrophysics in conducting a series of workshops in several universities in the length and breadth of the country. These workshops, attended by both the graduate students and staff, created the enthusiasm among the educational community to spread proper astronomy education. A brief outline of the development is given below.

**2. Elementary Schools.** The need for school teachers to be trained in astronomy, emphasized in the previous report, was appreciated by the astronomers. With that aim in view several activities aimed at the school teachers and bright students were organized. For example, in Pune in Western India, on the occasion of National Science Day on February 28, about 25 schools participated in various programs like quiz contests, lectures, slide shows, cartoon contest, painting contest, etc. Similar things were organized by Nehru Planetarium in Bombay, which added a poetry contest too. The increasing participation every year testifies to the success of this mode of astronomy education. Efforts are made by enthusiastic planetaria staff to give an opportunity for the students to look through small telescopes.

**3. Secondary Schools.** The continuing visits by neighbourhood astronomers to the secondary schools, accompanied by some practical sessions of looking through telescopes and lectures on topical themes like the cometary collisions etc. created good awareness among the students. The revision of the science syllabus to include astronomy in a larger way is still going on. There is a great deal of enthusiasm among the educationists in charge of school curricula, and hence perhaps by the time of the next report, it can be safely assumed that the secondary school syllabus will have a good portion of elementary astronomy included in the curriculum.

**4. University Education.** Many universities now include a special paper on astrophysics in their mathematics or physics graduate courses. The training of good and enthusiastic teachers, by exposing them to the latest developments, has been achieved by conducting workshops and minischools throughout the country. Furthermore, the conducting of regional schools on a regular basis in various parts of the country, with the active support and encouragement of IUCAA, Pune, has at last opened up astronomy education in the university sector to a decent level. The establishment of a centre in Eastern India through the efforts of several organizations like CSIR, University, NCRA and some enthusiastic astronomers from the US, has resulted in several students taking up astronomy education.

**5. Public Education.** The public education through several interesting TV programs is helped by some dramatic possibilities like the cometary collision with planet Jupiter or an impending doom by the Earth-grazing asteroid, etc. Though the public still views all these events with a supernatural outlook, slowly the astronomers have succeeded in making the public understand the significance of major events and discoveries in astronomy. The repair of the Hubble Telescope shown on network TV created such a lot of enthusiasm that newspapers were flooded with enquiries.

The report will not be complete without referring to two very important events, which took place in Pune. The holding of the Asia-Pacific Meeting and the holding of the 20th International School for Young Astronomers. Both these events led to the realization of the importance of astronomy for India making the nation proud of their achievements.

## TRIENNIAL NATIONAL REPORT

### ITALY

Laura Abati Erculiani, Chairperson: Didactic Commission; Italian Astronomical Society

In Italy, the general public has had an increased interest in astronomy. The research level in astronomy is also higher, but the interest in astronomy educational questions is not the same. It follows therefore that it is very difficult to carry out projects for teaching astronomy. The idea that the future of astronomy, as well as the future of our society, is decided at school is going to spread, but very slowly.

For a long time, the Italian Astronomical Society, a free society of professional astronomers, amateur astronomers and teachers, has had an Educational Committee consisting of university professors and teachers. This commission is a sort of concentration nucleus for the activities concerning teaching astronomy: it regularly interacts with public authorities, other scientific societies, teachers' associations, and it makes sure that astronomy is not forgotten in the science curricula. It works out curriculum proposals; it offers modular courses for teachers; it arranges summer courses for teachers; it promotes competitions in schools, and text-book analysis; and it brings out educational materials. Moreover, during its annual congress, a special educational session is scheduled and it calls a traditional one-day meeting with local teachers. In the S.A.I.T. section of Reggio Calabria a Didactic Laboratory of Science has been recently established, in cooperation with some universities. It is a very active educational center, especially for the south of Italy.

Several activities take place at many astronomy observatories and departments as well, in order to promote the teaching and the diffusion of astronomy. Generally, they are not institutionalized, and everything is due to personal interest. There is also great difficulty in finding funds for science education from the Ministry of Education, the Ministry of Universities, as well as from the National Council of Research. The reason is perhaps that educational research is not very profitable for a university career.

Now a law in 1990 (law 341), which has not been applied yet, imposes university training for all teachers, and this is the greatest change in education in general, and in astronomy as well. The law sets up a degree for the primary school teachers (at first a secondary school specific certificate was sufficient) and it sets up a postgraduate specialization school for the secondary school teachers. In this specialization school, the disciplinary knowledge is considered as acquired in the different university normal courses, and there are courses of educational science, disciplinary didactics, laboratories of disciplinary didactics, as well as practical training. As astronomy is not an independent discipline, there could be an astronomical module in courses in Didactics of Physics and of Natural Science. A national conference on the new established interdepartmental university centres coordinates proposals. The greatest effort for the teaching of astronomy has therefore moved from the curricula of different level schools, a task which has involved us for many years and about which we will discuss later, to the training of teachers. Hence it follows that there is a great necessity and need for research in astronomy education.

1. Elementary Schools. We think that the aim of teaching astronomy in all schools is to understand that we live in the universe. In elementary schools the main objective is the observation of the two main alternations: light-darkness, heat-cold. The structural change of this school has taken place over the last few years and the new programmes introduced in 1985 imply a global

educational project which considers the different abilities of pupils in different courses. Astronomy is integrated in the science discipline - in the theme "Natural environment and skies" - in a unit with the title "The Earth and its location in the Universe". Some observations about the main astronomical phenomena of nature are suggested, also thanks to simple self-built instruments.

Even if astronomy is considered in the primary school, it is not largely taught because of the vastness of the proposed programmes, and the poor and insufficient astronomical knowledge of teachers. However, the few teachers who have followed specific training courses are irreplaceable collaborators in research in the field.

**2. Secondary School - I Level.** The aim of 1979 programmes is the consciousness that the Earth is part of a large system. Astronomy is included in one of the five science topics: "The Earth in the solar system", and besides reconsidering the observation of the commonest astronomical phenomena, it examines the composition of the solar system, distances, methods of exploration (rockets, probes, ...), and subjects of particular interest for 11 to 14 year-old students.

**3. Secondary Schools - II Level.** We have been waiting for the reform of this level for many years, a reform which now should be at hand. Meanwhile, the point is that many programmes are gradually modified through "experimental projects". At present, two experimental models are supported by the Ministry of Education and are subject to tests in schools. Astronomy is present in both the models. The programmes of the last model have been elaborated by a commission we belong to. Astronomy is integrated both with earth science and with physics. For the first time, an astronomical topic, "The physical universe", independently organized, is present in all secondary schools. But the formal presence is not sufficient to guarantee the teaching of astronomy and particularly a correct teaching of it.

A recent survey of a selected sample of physics teachers shows that, even if there is an elevated interest (top score) in astronomical topics, the laboratory activity is practically non-existent. However, students at this age welcome any proposals in the astronomical field with great enthusiasm. Many students, in fact, took part in the competition organized by ESO on the occasion of the first European Scientific Week. The national winner won, together with the winners in the other countries, a stay at ESO in Monaco and at the telescopes in Chile. This student keeps on visiting the Asiago Observatory in order to improve his interest as well as to reduce the data obtained during his stay at ESO.

**4. University Education.** Astronomy and Astrophysics are offered by many courses in physics and natural science as a non-compulsory subject. A specific degree in astronomy is present in two universities: Padua and Bologna. Many universities offer a Ph.D. in Astronomy. Because of the already mentioned law concerning teacher training, specific modules of astronomy didactics and astronomy didactics laboratory are to be set up in the postgraduate specialization schools for secondary school teachers as well as astronomy modules in primary school training. Methodology and contents of these modules are not defined yet. For all these reasons, if we want astronomy to be present in the teachers' training, and consequently in the school, it is necessary to work hard throughout all levels.

**5. Public Education.** Many activities to popularize astronomy are being developed in most observatories. The number of amateur astronomical associations as well as planetaria is strongly

increasing. Amateur astronomers are irreplaceable in these activities. Planetaria are very important also for the schools which attend them frequently. Slides, videos, and software reviews are published by them as well as by the Italian Astronomical Society. An astronomical magazine, "The Astronomy", is widely sold in newspaper kiosks. Also, the activity of universities for elderly people, which are widely developing, is not to be neglected. The difficulty here consists only in finding teachers because 'students' are more and more numerous, and astronomy is one of the most appreciated subjects.

## **TRIENNIAL NATIONAL REPORT ASTRONOMY IN SAUDI ARABIA**

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In the last twenty five years, more than 100 astronomers have graduated from two astronomical departments, one in King Saud University (KSU) in Riyadh and the other in King Abdulaziz University (KAU) in Jeddah. About 15-20% of those graduated are working in fields related to astronomy, among them five with a Ph.D. and three with an M.Sc.; also two are studying for a Ph.D. and three for an M.Sc. Most of the other astronomy graduates are teaching math, physics or general sciences in schools.

The number of academic staff in both universities is ten with a Ph.D. (5 Saudis and 5 non) and five research assistants, and no post-graduate students. Both departments in KSU and KAU have Celestron 14" with photon counters, 15 cm Coudé refractor, solar laboratory, small planetarium and astronomical measurement instruments. In addition, KAU has a CCD camera, where KSU has a double telescope with 45 cm Ritchey-Chrétien and 24 cm Schmidt telescope. All these observational facilities are located near by the universities, where the light pollution is very high, which limits the observations. Now there is a plan to move the KSU double telescope away from Riyadh.

There is a plan to make the two departments in KSU and KAU as astronomical group in Physics departments, due to a lack of students and Saudi teaching staff, and also to the cut in university budgets.

The Institute of Astronomical and Geophysical Researches (IAGR) in King Abdulaziz City for Science and Technology (KACST) has a Special Royal Decree to take care of all large-scale astronomical projects, such as the National Observatory Project (NOP). The site selection program for NOP was started ten years ago by KACST, with the help of a Canadian team, then an American consultant. But the Gulf war and the oil fires of Kuwait affected the Saudi atmosphere, which delayed the project. On the other hand, the earthquakes in Egypt, directed most of the efforts of IAGR and KACST to geophysics projects, which reduced the budget of the astronomy projects.

Six astronomers are working in IAGR, none with a Ph.D. or M.Sc. KACST has four 15 cm Coudé installed for NOP site selection, three Celestron 14" for Islamic crescent visibility. KACST has a huge ten year database of solar observation done by the solar village in Oiaina (near Riyadh).

KACST is finalizing a contract with Australia to have a Laser/Lunar ranging telescope (75 cm); this telescope will be used for geodesy and geodynamic studies and research also for earth rotation problems, polar motion and time-service.

There is a 3 m radio observatory designed by the electrical engineering department and the astronomy department in KSU to observe the sun, with plans to use KACST 10 m radio antenna; this antenna is used now for remote sensing only. But the lack of staff makes the progress slow.

In Riyadh there are two big planetariums which will be open to the public shortly. There are two science museums in Saudi (one in Riyadh and other in Jeddah); half of their shows are about astronomy.

We hope further astronomical development will occur soon; with local and international cooperation.

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