

# INTERNATIONAL ASTRONOMICAL UNION

## COMMISSION 46 - TEACHING OF ASTRONOMY

### NEWSLETTER

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#### Editorial

I must apologize for the lateness of this issue. This was partly due to the pressure of other duties this summer (notably the organization of the AAVSO's first European meeting, in Brussels, in July). I also realized that, in the year before the IAU General Assembly, there would be several "special issues" of this newsletter. Finally, there was the usual problem: no one contributed any articles ! You will notice that several of the articles in this issue have been reprinted from other sources. PLEASE send me your contributions.

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*Enlisting the Help of Students.* It is always a pleasure to see a group of students organizing a project or event, because they do it with such energy and enthusiasm (as well as effectiveness). In this issue, there is an article about the Royal Canadian Institute Youth Science Academy, which has organized a variety of events and resources to support their own education. I witnessed a similar phenomenon earlier this fall, in connection with the Centennial Conference of the Science Teachers' Association of Ontario (of which I am Honorary President). At the annual conference of this group (which attracts over 2,000 teachers), there is a student conference – which is planned and organized by local students. Several hundred students participate in this conference each year.

A few issues ago, I described the University of Toronto Mentorship Program, which enables talented high school students to work on research projects with faculty members. As much as possible, I have arranged for my student to go back to his/her school, and give talks or demonstrations to students and teachers, and thereby increase the amount of astronomy in the high schools. This summer, the Canadian government's "Challenge '90" program enabled me to hire a bright high school student, Ingrid Zorgdrager, to develop activities in astronomy for the grade 12 physics course. As someone more familiar with that course than I am, she was able to do an excellent job of optimizing these activities, and writing the instructions in language that another student could understand.

I hope that you will get as much enjoyment as I have done, enlisting the help of students in the cause of the teaching of astronomy.

## IAU COMMISSION 46 MEETINGS AT THE BUENOS AIRES GENERAL ASSEMBLY, 1991

In the last couple of weeks of July 1991, members of the International Astronomical Union (IAU) will again convene for one of their triennial General Assemblies (GA), this time in Buenos Aires, Argentina. In connection with this GA, IAU Commission 46 will hold three kinds of meetings, namely (i) business, (ii) "scientific" and (iii) schoolteacher-astronomer meetings. (Please, note that all those dates mentioned below are still preliminary.)

(i) Business: *Friday* afternoon July 26 11.00-12.30 and *Tuesday* July 30 11.00-12.30. This meeting will be devoted to questions concerning Membership, International School for Young Astronomers (ISYA), Visiting Lecturers Program (VLP), Travelling Telescope (TT), Newsletter, Astronomy Education Material (AEM), Student Mobility, International Space Year (ISY), UNESCO.

(ii) "Scientific": *Wednesday* afternoon July 24 14.00-17.30. The topic of this meeting will be "Introducing Modern Astronomy and Astrophysics into Classroom Exercises - At high School, University Undergraduate and Graduate Levels". Although there will certainly be some emphasis on computers and image processing, the topic should definitely not be exclusively computer-oriented. If you are interested in presenting a paper at this meeting on the above topic, please send the title and a one-paragraph abstract to me, Aage Sandqvist, before FEBRUARY 28, 1991 (see my addresses on the letterhead of this newsletter). The IAU Commission #46 organizing committee will then select the final program and accepted papers will probably be allotted 15 minutes (depending on the submittal pressure). In your letter of submission, please state your IAU status (IAU member, IAU Commission #46 member - national representative, regular or consulting).

(iii) Schoolteacher-Astronomer: *Monday* July 22 all day. It is a tradition that on the day preceding the beginning of the GA, a one-day meeting is held between local schoolteachers and professional astronomers to give the host country teachers an opportunity to meet some of the many foreign astronomers. The Argentinian Schoolteacher-Astronomer meeting will take place in the Buenos Aires planetarium and its topic will be "Methods and Means for Teaching Modern Astronomy". The working language of this meeting will be Spanish (although there may be a possibility for simultaneous translation). Those of you who plan to attend the GA and would like to participate actively in this meeting by e.g. giving a talk, please contact Prof. J.C. Muzzio, Universidad Nacional de la Plata, Facultad de Ciencias Astronomicas y Geofisicas, 1900 La Plata Argentina (E-mail : jcmuzzio @ fcaglp. edu. ar).

I hope that many of you will be able to attend the General Assembly in Buenos Aires in 1991 and will wish to participate in our Commission's planned activities in one way or another.

See you then !

Aa. Sandqvist  
Stockholm Observatory  
President: IAU Commission #46

## INTERNATIONAL COLLOQUIUM

on

**"THE ASTRONOMICAL CULTURE IN MODERN SOCIETY"**

July 16-20, 1991

MONTEVIDEO, URUGUAY

**Introduction.** The extraordinary development of astronomy in the past decades is now making even more necessary than ever the diffusion of scientific knowledge among all kinds of people who, in the end, provide the financing of scientific investigations. But, to what extent is any success achieved in the diffusion of astronomical knowledge? A main important role should be played by mass media dedicating more time to journalists, writers and scientific communicators. But, how many of these communicators are working in mass media nowadays? However, newspapers are full of horoscopes and other forms of superstition! The role of these communicators could be fundamental to carry on world campaigns about preserving man's environment, for instance. An important contribution could also be carried on by amateur astronomers. Are they doing it? How many countries have included in elementary and secondary schools curriculum plans for astronomical education? In modern society astronomical culture, or astronomical education as it may also be called, is not the same as the training of professional astronomers, which is fundamental for the advancement of scientific research; astronomical education tends to integrate people to that scientific advance.

**Topics to be dealt with**

- 1 - The role of science writers and journalists in modern society;
- 2 - Astronomy and superstition;
- 3 - The creation of planetary conscience on the need to preserve the natural environment (ozone depletion, the greenhouse effect, ocean pollution, etc.);
- 4 - The role of amateur astronomers in public education;
- 5 - The teaching of Astronomy at elementary and secondary schools.

**Scientific Organizing Committee.** Julieta Fierro, Patrick Moore, Juan Carlos Muzzio, Mazlan Othman, Jay Pasachoff, John Percy, Licio da Silva, Osvaldo Vaio and Gonzalo Vicino.

**Local Organizing Committee.** Julio Fernández, Hebe Ligerini, Conrado Schneider, Osvaldo Vaio and Gonzalo Vicino.

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## THE INTERNATIONAL SCHOOL FOR YOUNG ASTRONOMERS IN MALAYSIA

The XVII IAU School for Young Astronomers (ISYA) was held in Malaysia from 28 May to 15 June 1990. Public astronomy is advancing rapidly in Malaysia by construction of a national planetarium in its capital, Kuala Lumpur, and the introduction of 20 hours of astronomy as part of a new secondary-school science curriculum. This ISYA both contributed to and benefitted from the Malaysian interest in astronomy. It was sponsored and received financial support from the Universiti Kebangsaan Malaysia near Kuala Lumpur, the IAU, the International Center for Theoretical Physics (Trieste), COSTED (ICSU), and the Malaysian government.

Twelve participants came from India, USSR, Indonesia, Korea, Thailand, Philippines, and China. About 15 Malaysians participated in portions of the school. They included two resource teachers associated with the new curriculum. Two planetaria were represented (Kuching, Malaysia and Jakarta, Indonesia). About 90 hours of lectures covered topics ranging from solar physics to distant galaxies. There were three special topics: i) Access to data from space astronomy experiments (with support from ESA); ii) positional astronomy and the construction of an almanac, using PC's, tailored for national needs; and iii) the design and use of small telescopes, aided by the IAU Travelling Telescope (sent with the support of Air Canada) and a telescope donated by the University of Toronto. The faculty came from Japan and Australia, with the goal of aiding regional collaborations, and from USA, Canada, U.K., Czechoslovakia, Italy, and Malaysia.

The most lasting benefits for participants may well be a broader perspective on astronomy and astronomers. Some participants, coming from observatories dominated by a single senior astronomer, had not observed any "live" scientific arguments, and so a special session on solar prominences was allowed to turn into a spirited debate. The scope of the lectures, though overwhelming in detail, broadened the astronomical background of each participant. All participants gave at least one short seminar. Those with some research experience garnered the relevant faculty for individual discussions and, occasionally, for a future collaboration. Faculty and participants were encouraged to mingle, forcing some to gather new courage to converse in English.

Personal contacts were easy in our beautiful surroundings. For two weeks we stayed at the Maritime Academy of Malaysia, near Melaka, on the shore of the Strait of Malacca. Dinner was served under palms and tropical stars. Most importantly, the school went smoothly because of the tireless efforts of its director Mazlan Othman (designate director of the national planetarium). She arranged not only the housing and lecture facilities, the publicity, and the four public lectures but also transport to and from the airport and excursions for shopping in Kuala Lumpur, for sightseeing in historic Melaka, and for swimming at a public beach. She and her husband solved the problems of visas and telescope customs clearance and the whole host of minor problems engendered by the numerous participants and faculty. We owe her tremendous thanks.

Donat G. Wentzel  
University of Maryland



## A PEAK EXPERIENCE

Residents of the picturesque village of Castel Gandolfo, 30 kilometres southeast of Rome, may have been surprised to hear rock-and-roll emanating loudly from their most famous institution one night last July.

"The people must have thought something really wild was going on inside the papal summer palace," says Professor Robert Garrison of the Department of Astronomy. The party was the last social event for 25 graduate students and their instructors attending the Vatican observatory's summer school program.

Garrison and Professor John Stocke of the University of Colorado spent five weeks at the observatory from June 9 to July 12 lecturing on stars and galaxies. "It was a peak experience," Garrison said. "I'd spend 12 hours a day at the palace working with students who were all so full of energy. It was very inspiring."

Castel Gandolfo (also the name of the pope's summer residence) houses an observatory where Jesuit astronomers conduct research year-round. Since 1986 the Vatican Observatory School in Astronomy & Astrophysics has held three summer school sessions.

The students, who were selected from 125 applicants, came from Asia, Europe, Africa, New Zealand, South and North America. "We picked the ones we thought would benefit the most from the experience," Garrison said. High academic standing was the most important criterion but females and students from third world countries were given an edge.

Garrison was invited by the dean of the summer school, Chris Corbally, who holds a PhD from U of T. Corbally, a Jesuit, is an astronomer at the Vatican.

The observatory is noted for stellar classification - Garrison's area of expertise. One hundred and twelve years ago, Father Angelo Secchi, one of the Vatican astronomers, was the first to classify the stars according to their spectra. "When there are billions of stars, you want a method of filtering out which are interesting to study and which are of the garden variety," Garrison said. By classifying them, scientists can determine the structure of our Milky Way galaxy.

During weekdays, students spent their mornings and afternoons in the classroom with regular and visiting lecturers. There were no translators so lectures were held in "careful" English, Garrison said. In the evenings, students went to the library for extra reading or to the observatory. There were no tests, grades or assigned homework.

"Their enthusiasm renewed my faith in real education," Garrison said. "What struck me was that the students really appreciated the opportunity to study with good astronomers in a trusting environment. They took responsibility for their own education. I'd like to incorporate some of these principles at U of T."

On the weekends, the group went on field trips to Florence, where they saw the house in which Galileo spent the last years of his life, and the Castelli Romani "hill towns" east of Rome.

The Vatican provided a "loving, caring and supportive" environment for both staff and students, Garrison said.

Accommodation, meals and field trips were paid for by the church although students were responsible for a portion of their air fare depending on their financial capabilities. The faculty was not paid for teaching but transportation and accommodation were provided.

Although Pope John Paul II was not present at his summer residence during the five weeks, the group did have a private audience with him at Vatican City. He spoke for about half an hour on the importance of research in Astronomy and preserving the harmony of human beings and the universe. Afterwards he greeted each student in his or her own language. One Polish student who was getting married in August invited the pope to her wedding.

Garrison gave the pope a copy of *University of Toronto: A Time to Remember*. "He was very gracious, he flipped through the pages and said he'd been to Toronto three times and enjoyed it very much."

Jane Stirling

Reprinted from  
The University of Toronto  
Bulletin  
September 10, 1990

## SUMMER SCHOOL FOR TEACHING OF ASTRONOMY IN FRANCE

CLEA, which is an abbreviation of Comité de Liaison Enseignants et Astronomes, is an association in France, where professional astronomers and teachers gather their intentions to promote the teaching of astronomy on all school levels and in other institutions of popular science. This activity goes back to 1970, when there was no astronomy at all in French school programs. At that time a small group of astronomers had made up their minds to introduce the teaching of astronomy in schools and to train schoolteachers. Initiated by the General Assembly of the IAU in 1976 in Grenoble and by IAU Commission 46, a first summer school took place in 1977. The very active French group continued to hold this program since then with great success. The experiences of these summer schools are piling up in the Reports, the *Comptes Rendus* and in the *Cahiers Clairaut*, the permanent newsletter of CLEA. A condensed report on the activities of CLEA was given by L. Gouguenheim *et al.* at the IAU Colloquium 105 on "Teaching of Astronomy" in 1988 in Williamstown, USA.

This year again CLEA has organized a summer school on 19 to 28 August on Col Bayard, 1250 m altitude, 10 km from Gap in the Hautes Alpes. This place is ideally situated for observations at night, for very efficient working in a calm resort and for a relaxing view of the magnificent mountains in the background and of the meadows of a golf course just in front of the building.

About 90 participants, limited by the capacity of the hotel, coming from all parts of France, attended this summer school, the majority of them being teachers at schools of all levels. The stay was supported by the French National Ministry of Education and by the European Space Agency, which contributed interesting reports about its missions and future activities.

The working program was really packed. It offered four hours of scientific lectures each morning. In the afternoon there were 33 working groups and 29 workshops, up to nine in parallel at any time, ranging from producing astronomical equipment by hand up to analyzing experimental data, treating theoretical problems or tracing historical roots. CLEA had installed in the hotel a whole library covering almost all important fields of astronomy and a complete mechanical workshop with band-saw, drilling machines and all necessary tools. Three installed photo labs made it possible to develop photographic films. There was even one lab for developing color films by hand with an inviting on-line instruction on tape.

The evenings provided films, dias and presentations of results in different fields. And the nights were reserved for observations with binoculars and telescopes as well as for taking photographs of constellations and stellar spectra with simple cameras.

It is a well-known fact that astronomy keeps appealing to all who have once started teaching astronomical topics. So all participants were highly motivated. But it is the merit of the excellent and experienced crew of CLEA, that this summer school achieved a charming combination of really hard and efficient work with having great pleasure and joy. I cannot remember another meeting, which ran in such a creative and cooperative mood. This is worth mentioning, because teaching is specifically attractive to the pupils and successful, when it is performed with just this spirit of delight and motivation. We should be happy to bring this spirit into our schools.

Personally, I learned a lot of valuable ideas and gained many useful skills and experiences. And I have to add that our French friends have the ability to create an exceptionally charming atmosphere, which made these working days feel like vacations. I think, this type of summer school can be pace-making for good teaching of astronomy in our schools. CLEA has the right concept for it and shows how to practice it.

Roland Szostak

#### A YOUTH SCIENCE ACADEMY

The Royal Canadian Institute Youth Science Academy is an organization for students with a special interest in science. Members come from the senior years of high school and the first years of university. They are immersed in the fascinating world of science; its different fields, current events, future prospects, job opportunities and much more.

A Council, composed of students, directs activities with the assistance of the Royal Canadian Institute and the Toronto Board of Education. The Royal Canadian Institute, an organization formed in 1849 with the purpose of promoting science, initiated the Youth Science Academy in late April, 1989. The YSA now has over 280 members, and its first year of operations has been very successful.

Each season offers two seminar sessions and two excursions. At each seminar session, three experts take thirty minutes each to present a specific topic. There are short question periods after each speaker and time for informal discussion during refreshments. Excursions to the Pearson International Airport and the Northern Telecom microelectronics plant were held during the 1990 fall season.

The RCI Youth Science Academy also provides a computer bulletin board service. Members with access to a computer and a modem can dial in to the BBS 24 hours a day to exchange information and opinions on scientific topics.

The purpose of the RCI Youth Science Academy is to expose students to science in a non-academic environment, to bring people with common interests together, and to establish a link between students and scientists. The Academy has been enormously successful in every respect. The Council of students has worked hard to plan the activities, and to prepare an "operations manual" with little or no assistance from the adult advisors. For more information, write to the RCI Youth Science Academy, 720 Spadina Avenue, Suite 312, Toronto, Ontario, Canada M5S 2T9.



## ICSU PRESS AND THE THIRD WORLD

### What is ICSU Press?

ICSU Press began life as the publishing house of the International Council of Scientific Unions, based in Paris. Since its founding in 1983, ICSU Press issued some 40 books and monographs, and launched three journals. Most of these came from ICSU family members and were co-published with established publishing houses, such as Cambridge University Press and Pergamon Press, which handle printing and distribution. Since the beginning of this year, ICSU press has been renamed the ICSU Press Publishing Service and its activities will now focus on providing advice on a range of publishing matters to the ICSU family, and on publication problems in developing countries.

Over the years, one of the main aims of ICSU Press has been to assist Third World scientists and their institutions in matters relating to scientific publications, and to work with ICSU member bodies to serve these needs. This has been done as follows:

- i) A portion of the royalty earnings of ICSU Press has been used to purchase selected ICSU Press journals and books for developing country institutions.
- ii) As far as possible every contract between ICSU Press and its commercial partners has provided for up to several hundred copies for Third World distribution, the main outlet for which is the Third World Academy of Sciences in Trieste, and ICSU Scientific Associate. ICSU's Committee on Science and Technology in Developing Countries (COSTED) also receives copies of all ICSU publications. The total retail value of all books and journals donated in this way from 1987 to 1989 was over US \$100,000.
- iii) ICSU Press has actively encouraged member bodies to set up their own procedures for improving the distribution of their publications to developing countries, including the possibility, in line with the ICSU Press scheme, for allocating a share of royalty or other publication income to Third World libraries; or a service for recycling appropriate surplus books and journals to Third World institutions.

### The Trieste Workshop

In pursuit of these objectives, ICSU Press organized a Workshop in Trieste in late 1988, in conjunction with the Third World Academy of Sciences, the International Centre for Theoretical Physics and the International Development Research Centre, on increasing the southward flow of scientific publications. From this meeting of representatives of various scientific societies and publishers came a general policy statement that every developing country should have at least one library accessible to all scientists working in that country where relevant journals and books in science and technology should be available. A well received proposal to this end was made by Professor Abdus Salam, President of TWAS and Nobel Laureate, that Libraries in a selected list of some 40-50 countries should be provided with some 100 core journals in the biosciences, chemistry, mathematics and physics, the necessary costs to be met by grants from donor agencies, societies and scientific publishers.

As a follow-up to the Trieste Workshop ICSU Press is now working with TWAS to realize Salam's dream and to develop a network of scientific societies, agencies and publishing houses with existing or planned distribution programmes in order to share information, avoid duplication and optimize financial resources. Among those organizations represented in Trieste and cooperating in this informal activity are the American Association of the Advancement of Sciences (AAAS), which has its own major programme for sub-Saharan countries, World Scientific Press in Singapore, the International Atomic Energy Agency, Unesco, the UN Centre for Science and Technology for Development, the Association of Geoscientists for International Development, the African and Latin American Academies of Sciences, the Physical Society of Japan, the International Union of Biochemistry, and many others.

In a related move, a draft proposal is now circulating among Canadian scientific societies for a concerted effort to increase the distribution in developing countries of Canadian scientific, scholarly and technical journals, this being assisted by CODE; the Ottawa-based Center for Overseas Development through Education.

### **Some Common Problems**

In any program to increase the southward flow of journals and publications there are many issues to be faced and problems to be overcome. These include selecting the recipient institution, handling the shipping and delivery process, avoiding undue inroads on established commercial markets by both international publishers and local distributors, securing the finances required to pay for the services, evaluating the service, ensuring "sustainability" and self-sufficiency, and avoiding continued dependency on charity.

Given that the cost of a run-on supply of journals and books at the time of printing need not necessarily be onerous, one might suppose that i) donor agencies would be pleased to contribute by covering handling, shipping and evaluation costs that in total would be only a small fraction of the retail value of donated publications, and ii) that identifying appropriate recipients and relevant books and journals would be trivial task. The experience of many organizations has, however, shown this not to be the case. The problem continues to be that many scientific groups with their own programmes have been or are planning to go alone in this. The result is that the same mistakes are made repeatedly.

Unless one knows in advance the number of copies to be distributed - and that requires advance identification of recipients - and from where the funds will come to pay for handling and shipping charges, it is hard to be confident of a planned print over-run, or an advance order at a reduced pre-publication price. Moreover, funding agencies are too busy to deal with many organizations looking to them to fund separate, often competing, programmes. The advantages of doing this cooperatively seem obvious - and it is to this end that ICSU Press, TWAS and others are trying to set up mechanisms for common action.

Nevertheless, the selection of recipients for what must be a limited supply of literature is a difficult and invidious task. What are the best criteria to use in this process? This may not be difficult in small countries where there is but one major university, but how should one deal with Brazil, Argentina, Nigeria, India, Egypt and China? And where does one find an accurate and up-to-date list of scientific institutions in

developing countries, categorized by discipline and by research strength? (In an attempt to develop the latter, ICSU is now working with TWAS and the UN Center for Science and Technology for Development to compile just such a directory of southern science).

Even if the choice of the institution is obvious, does one select the main library, which may not be functioning well because of a shortage of trained personnel, for example, or should books and journals be sent to the Departmental reading room? How to ensure that donated material does not end up in locked cabinets or in the private collections of senior scientists? All donation programmes should have a built-in evaluation mechanism.

In the long run, of course, donations of books and journals cannot be the solution. Continued dependence on gifts will not create the sustainability that science - and progress - need. Publishers and other donors are far more likely to join book and journal schemes if they see evidence that recipients are working towards self-sufficiency.

### **Final Comment**

Despite these problems - challenges - the need for strengthening southern scientific communities has never seemed more urgent, with increasing global concern over environmental resource degradation, coping with which requires scientific knowledge and expertise. This cannot be done unless our colleagues in third world nations can gain access to and participate in the scientific mainstream. Ensuring a steady supply of current scientific literature filling the gaps in archival collections is one obvious requirement, as many northern scientific societies now recognize.

ICSU Press and its other partners are working on these ideas, and it is expected that some firm project proposals will see the light in the very near future.

A.R. Berger  
Geological Survey of Canada

*Reprinted from Science International - the Newsletter of ICSU*

## EDUCATIONAL PROGRAMS AT SPACE TELESCOPE SCIENCE INSTITUTE

During the past few years, we have established a small but substantive educational and public-outreach program at STScI. Recently, our programs have become partly supported by the newly established John Hopkins Space Grant Consortium, wherein STScI has joined forces with JHU, its Applied Physics Lab, and Morgan State University to enhance the study of space science at all levels. Our programs generally fall into three categories:

1. *Public Outreach.* The STScI public-outreach program actively involves many staff members. This is best exemplified by our Speaker's Bureau, which currently sends technical staff into the surrounding schools and civic organizations at the rate of about one per day.

To satisfy the general public's thirst for information about the HST mission, we have for several years conducted an Open Night at the Institute. On the first Tuesday evening of every month, a staff scientist gives a talk, followed by a video and an opportunity to view the heavens through small telescopes mounted by amateur astronomers of the Baltimore Astronomical Society.

2. *Educational Programs.* Many of our formal educational efforts are directed toward pre-college teachers, attempting to activate the "multiplier" effect whereby teachers can amplify what they learn among their classes and school systems. STScI annually conducts several Teacher Workshops, some only for a day's duration during the academic year, others more intensively for a week during the summer. Generally limited to 30 teachers apiece, our workshops are usually offered for high-school science teachers. We have also been leading some workshops for Baltimore's middle (and even elementary) schools. Last month, under the auspices of the JHU Space Grant Consortium, we directed a 4-day conference that attracted some 300 teachers from nearly every state.

Teachers, especially those who have attended our workshops, are encouraged to return to STScI with their classes. A lecture is presented on the HST mission, a staff member addresses them about careers in science and technology, and the students leave with some materials useful to them in their studies.

Since our teacher workshops are heavily oversubscribed, with many hundreds of teachers being turned away annually, we have captured the essence of a typical workshop in a Teacher's Kit. The kit includes slides, posters, videos, hands-on activities, glossaries, and a wealth of brochures describing, predominantly, the HST science mission.

Led by Morgan State and other members of the JHU Space Grant Consortium, STScI is supporting a Teacher Training Program for Women and Underrepresented Minorities. The program, designed to encourage women and minorities to pursue careers in science and engineering, begins by identifying talented students at the high-school level, designating them "space scholars," tracking and supporting them through college and even, perhaps, graduate school. Enrichment programs at STScI, Applied Physics Lab, and many other local area technical organizations are made available to these students throughout their schooling days.

3. *Video as a Teaching Aid.* We are also developing video programs that can be used in the classroom.



Some years ago, we established an Astronomy Visualization Laboratory and equipped it with an array of computer graphics devices that can produce broadcast-quality animation. With an artist in the pilot seat of a Silicon Graphics 3130-4D Workstation, and a scientist in the co-pilot's seat, we are building a Video Library of short animations covering the spectrum of astronomical knowledge. Actually, three libraries are being readied; one for astronomy in general, another specifically for the HST mission, and a third that addresses fundamental principles of physics. In this Lab we are also preparing "video bites" - 20-second video clips that highlight the early images and data to be released from HST; these then form the basis for video press releases that accompany the more standard, hardcopy press releases.

STScI is co-producing with Maryland Intec (the instructional arm of Maryland Public Television ([MPT]) a 32-part instructional television program on astronomy. Called "Starfinder" and beginning in the fall of 1990, this series of weekly shows, filmed at STScI and MPT, will present basic space science to middle-school (7-10) grades where we believe the need is greatest, will highlight some of the results from the HST mission, and will include a short segment about careers in science and technology. These programs will be transmitted weekly for schools throughout the state of Maryland, and via the PBS network for distribution nationwide (and into Europe as well).

At STScI, we are building an Orbital Status Display Board to provide real-time display of HST activities. Driven by a personal computer and time-tagged to HST's observing calendars that are built at STScI, this display can show virtual real-time activities of the HST mission. Other monitors surrounding the real-time display show the latest imagery released into the public domain and also highlight the inner workings of HST and its scientific instruments. The prototype of this board is now up and running in the STScI lobby, and eventually will become exportable to other locations, including major science museums around the nation.

Since STScI is a research/operations center not readily accessible to the general public, we have developed an official STScI Visitor Center at the Maryland Science Center in Baltimore's Inner Harbor. There we have helped to mount exhibits and planetarium shows on the HST mission, and we are jointly sponsoring a number of additional education programs at the pre-college level.

Eric Chaisson  
Spaced Telescope Science  
Institute

Reprinted from Space Telescope  
Science Institute Newsletter

## MAILBOX

Dr. Edward F. Schmitter (Department of Physics, University of Lagos, Akoya-Yaba, Lagos, Nigeria) writes to describe the astronomy programs and courses which he has developed at the University of Lagos during the last 18 years. These include an introductory course - covering mostly stellar astronomy - for Surveying and Physics students, and an intermediate-level course in astrophysics for final-year undergraduate physics students. There is also an MSc program in Physics (Astronomy), which consists of course work, and is used to identify students who might be interested and qualified for advanced graduate training in astronomy. Dr. Schmitter has also installed a 14" Celestron Schmidt camera at the University, with an 8" Celestron as a guide scope. This system was used with great success during the recent apparition of Comet Halley, and attracted much public and media interest.

The long-term goals are to install a mid-size planetarium at the University, to foster public interest, and eventually to develop a national optical observatory in Nigeria. These are ambitious plans, of course, but not impossible, considering the progress which Dr. Schmitter and his colleagues have already made. His present needs are (i) to add one or more teaching staff for his program (ii) to build up a collection of books, journals and catalogues (iii) to obtain instruments and supplies (such as photographic plates) for the telescopes and (iv) to place one or two Nigerian students in PhD program overseas.

If any readers of this Newsletter can offer advice or assistance, I urge them to do so.

Two sessions on "the Teaching of Astronomy" were held at the 5th Asian-Pacific Regional Meeting of the IAU in Sydney in July. The papers presented at the meeting will be published in the Australian Journal of Astronomy. The first issue of the Bulletin of the Teaching of Astronomy in the Asian-Pacific Region was published in October 1990. Those who are interested in receiving this Bulletin should write to Dr. S. Isobe at the address below. The 4th meeting on Astronomical Education in Japan was held from July 30 to August 2, 1990, with 130 people attending. The Proceedings (in Japanese, with English abstracts) can be obtained from Dr. S. Isobe, National Astronomical Observatory, Mitaka, Tokyo 181, Japan.

David A. Pierce (El Camino Community College District, 16007 Crenshaw Blvd., Torrance CA 90506, USA) writes, in response to the editorial in Newsletter #29, to describe a one-day "what's New in Astronomy" program held at the University of California at Los Angeles each year since 1980. Four astronomers speak on their areas of research, each for one hour, followed by ample time for discussion. Attendance runs about 100, with 5 to 10 taking the program for university credit. The success of this program may inspire similar programs in other areas of the world.

Project STAR (Science Teaching through its Astronomical Roots; Center for Astrophysics, 60 Garden St., Cambridge MA 02138, USA) continues to develop excellent teaching concepts, apparatus and textbooks, funded by the US National Science Foundation. It and its sub-projects have now trained over 100 teachers from across the USA, who are now available to train hundreds more teachers. Over 200,000 students have now benefitted from the Project STAR materials. •

## THE IAU AND GLOBAL CHANGE

Studies of global change are directed towards understanding the thin shell comprising that which supports living matter against gravity and the atmosphere directly above the living matter. In astronomical terms an insignificant volume, but one of crucial importance to astronomers for a variety of non-astronomical reasons. How then can astronomy assist in the better understanding of this thin shell?

### Understanding evolution

The Earth is a planet - one of nine circling the Sun. Planetary systems may be a common consequence of star formation. Therefore, by comparing planets within the solar system and by searching for planetary systems around other stars, knowledge could be gained on the initial conditions for terrestrial evolution and the broad sweep of that evolution from these initial conditions to the present.

### Solar energy

The Earth derives all its energy from the Sun. The structure and evolution of the Sun are of vital importance to the evolution of the Earth. The study of solar terrestrial relations is of great importance in interpreting past evolution of the Earth and in constraining models of future evolution.

### Discontinuous changes

An understanding of the random events likely in an evolving planetary system can indicate if major discontinuous changes have occurred in the past and give some assessment of such events in the future. The Earth today may not have evolved continuously from some set of initial conditions to the present. There may have been a number of discontinuous events which altered the course of that evolution - **but**, the evolution subsequent to a discontinuous event may depend crucially on the stage of terrestrial evolution when it occurred. (An example of discontinuous event would be a major meteoritic impact, a comet collision, etc.)

### Earth's rotation

Precise measurement of the Earth's rotation can give important information on the evolution of the Earth. The coupling between the atmospheric tide and the Earth's rotation is one such example. The precise determination of Earth rotation is an astronomical problem which can now be tackled with immense refinement.

### The elements

The abundances of the elements are fixed by astronomical processes.

## The atmosphere

Astronomers must observe through the Earth's atmosphere. While often wishing it was not there, astronomers, more practically, correct for its effects. Some of these corrections have been applied and compiled over a long period of time. If relevant, these corrections could be investigated as measures of atmospheric change.

In attempting to characterize the nature of the thin shell containing terrestrial living matter, it is important to recognize that the problem is not a narrow one but has wider implications. Astronomical information from solar physics, comparative planetology, solar system dynamics and Earth rotation, for example, can play an important role in understanding that thin shell and its diverse behaviour. Despite its exotic appearance, astronomical science still has terrestrial use and application.

Besides the IAU, some ICSU interdisciplinary bodies can supply additional astronomical input, notably COSPAR, SCOSTEP and FAGS (in particular the International Earth Rotation Services and the Solar Services).

Derek McNally  
General Secretary, IAU

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