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COMMISSION 46 — TEACHING OF ASTRONOMY
NEWSLETTER

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Editorial

Greetings once again. This is the first "regular" issue of this Newsletter since January 1988. In an IAU General Assembly year, there are "special" issues of this Newsletter, containing interesting and important material: National Reports, and the listings of Astronomy Educational Material.

For me, the highlight of 1988 was IAU Colloquium #105: The Teaching of Astronomy. This issue of this Newsletter contains an article about the colloquium, written by Jay Pasachoff, who did such an excellent job of hosting the meeting. It was a pleasure to meet so many of you, and to spend a week immersed in the excitement of astronomy education in all its facets. Jay and I are busy editing the Proceedings of the colloquium, and we hope that they will be available to you later in the year.

This issue also contains a message from the President of IAU Commission 46: Aage Sandqvist. Like his predecessor Cecylia Iwaniszewska, he has a deep interest and concern for astronomy education in all parts of the world. I know that he (and all other members of the Organizing Committee) would be happy to hear your comments and suggestions about the work of IAU Commission 46. Last but not least, I want to thank Cecylia Iwaniszewska for the effectiveness and enthusiasm with which she has carried out her duties as President of IAU Commission 46, 1985 to 1988.

PLEASE send me your short contributions to the next issue of this Newsletter AS SOON AS POSSIBLE.

IN THIS ISSUE

THE TRAINING OF AN ASTRONOMER IN EGYPT

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1. Introduction

Twelve years after the establishment of the first faculty of science in Egypt, astronomy was added in 1937 as an independent department. In spite of the increased number of Egyptian universities, the astronomy department of Cairo University is still the sole department in Egypt for the qualification and awarding of B.Sc., M.Sc. and Ph.D. degrees in astronomy.

2. The B.Sc.

The undergraduate system of study of astronomy in the faculty of science allows the introduction of astronomy after two academic years devoted mainly to the study of mathematics and physics. During the period 1937-1958, the study of astronomy was on three levels in the third year;

i) Subsidary for students in other majors.
ii) General (two majors) for astronomy students studying also mathematics and/or physics, and
iii) Special for only astronomy students attending courses in both astronomy and mathematics which were deeper and more advanced than those attended by the second group.

During the same period, there were two levels only in the fourth year, namely either general with 5 lectures and 10 hours of tutorial and practical work weekly, or special as in the third year.

In 1958, a reform was introduced to the system of higher education in Egypt according to which subsidary astronomy was cancelled. Students were left to choose only between the general or special mode of study. Through this reform, astronomical knowledge is restricted only to astronomy students.

In 1972, another reform was made in the system of study of the faculty of sciences of Cairo university. The early specialization is the most striking characteristic of this reform; only the special alternative is allowed. Six weeks practical summer training was added to the curriculum after passing the third year examinations. It is done in the observatory, the department and some other institutes applying astronomy in their work. Only physics students of the second year could continue to study astronomy in the third year. This reform has limited on the one hand the number of astronomy students and on the ohter the depth of the mathematics taught to the astronomy students. In this respect the previous (1937-1958) two majors - either astronomy and mathematics or astronomy and physics - was better. The subsidary level, too, was best for many students to know something about the universe. We are therefore trying and waiting for a reform that either goes back to the two-major system, besides an elementary course for all physics and mathematical science students, or introduce the credit-hour system for all sciences.

2.1 Synopsis of the courses (1988) for B.Sc. astronomy

The following table gives the synopsis of the courses attended by an astronomer for his B.Sc. degree as it is in the academic year 1988/1989.

Year	Branch	Course	Hours per Week: Lectures	Hours per Week: Tutorial (T) Practical (P)+
First	Mathematics	Differential integration	3	3T
		Algebra	1	1T
		Analytical geometry	1	1T
		Mechanics	3	3T
	Physics	Properties of matter	1	
		Heat	1	
		Optics	1	
		Electricity & magnetism	1	1P,3T
Second	Physics	Alternating current: physical electronics	2	
		Electromagnetism	2	
		Waves	2	
		Thermodynamics & Heat	2	
		Mechanics & relativity	2	
		Atomic physics	1	
		Mathematical physics	1	3P,6T (total)
Third	Astronomy	Spherical astronomy	1	
		Physics of the atmosphere	1*	
		General astronomy	1	
		Photometry	1	
		Astrophysics	1	
		Stellar spectra	1	
		Solar system	1*	
		Stellar system	1*	
		Astronomical math.	1*	
		Special course	1*	3P,4T (total)
	Physics	Atomic physics	1	1P
		Quantum mechanics	2	
		Math. Physics	5	2T
Fourth	Astronomy	Spherical astronomy	1	
		Planetary atmospheres	1	
		Celestial mechanics	1	
		Stellar dynamics	1	
		Solar physics	1*	
		Astronomical Math.	1	
		Stellar atmospheres	1	
		Variable Stars and Nebulae	1	
		Stellar interiors	1*	
		Essay or Seminar	2	3P,2T (total)
	Physics	Mathematical physics and electrodynamics	4	2T
		Quantum mechanics	2	
		Molecular spectra	1	
		Plasma	1	1P

+the practical period is 2 hours
*one hour, half year

The graduated mathematics and physics students can continue to the M.Sc. degree in Astronomy after passing examinations of a qualifying year of study in the following courses:

3. The M.Sc.

Graduation with an M.Sc. in astronomy needs two years at least. In the first year, 10 hours weekly must be attended in 10 of the following courses, beside four hours of practical work: Celestial Mechanics, Radio Astronomy, Astrophysics, Stellar atmospheres, Statistical astronomy, Interstellar and Interplanetary matter, Cosmology, Stellar Spectra, Photometry, Planetary atmospheres, Solar physics, Stellar interiors and stellar evolution, X and gamma-ray astronomy, Instruments and experimental astronomy, Radiation and gravitational collapse, Special course. A second year at least, is devoted to finishing a research project and the presentation of a thesis.

In order to keep the international level, one specialized foreign examiner at least for the thesis must be chosen. Another examiner could be selected from a local institute. The third referee is the supervisor himself.

3.1 Qualification Studies

The B.Sc. graduation rate is different in different years and ranges between one and six in most cases. Sometimes there are extremeties like nil or 15. Two or three per year is a good average. This number is occasionally too much for the available jobs at the sole observatory in Egypt, and sometimes too small. In the last case, the observatory appoints a graduated B.Sc. in mathematics or physics. We therefore settled one-calendar-year program through which such a person could be qualified as an astronomer after attending the essential astronomy courses: Spherical Astronomy: 2 hours weekly, Celestial mechanics: 2 hours weekly, Special course: 2 hours weekly, Astrophysics: 4 hours weekly, General Astronomy: 2 hours weekly, Practical: 10 hours weekly. He or she could continue the M.Sc. program after that.

4. The Ph.D.

The Ph.D. is being offered for an acceptable thesis of at least two years of research work.

The commission of examination of the thesis is composed of three professors, one of whom at least, must be specialised and from abroad. Joint supervision with foreign professors of, especially, Ph.D. theses has proven to be fruitful and helpful in tackling up-to-date research topics, to overcome literature or laboratory deficency, and to exchange experience not only for the candidate but also between the supervisors. Sometimes invitations and visits are possible through scientific channels, cultural exchange agreements or other special arrangements.

THE TRAVELLING TELESCOPE

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The History of the Travelling Telescope Project

The concept of the travelling telescope was developed in 1984 by Derek McNally and Richard West, and first published in this Newsletter. They were aware that, in the developing countries, astronomers had little opportunity to gain experience with modern astronomical instrumentation. Without such experience, however, they could not hope to formulate credible proposals for modern astronomical facilities in their countries. Extended visits abroad could help to alleviate the problem, but were seldom possible. If astronomers from the developing countries could not visit a telescope, then perhaps it could visit them!

One of us (JRP) became aware of the idea of the travelling telescope as a result of the articles published by McNally and West. An application was submitted on behalf of the IAU to a new grants program of the Canadian Commission for UNESCO and the Canadian International Development Agency. The application was successful; indeed, it was the largest of the 40 grants awarded, out of more than 400 applications.

After considerable thought and consultation, we purchased the following equipment: Celestron Powerstar 0.2m (8") telescope, Meade heavy-duty tripod and various accessories, Canon F-1 camera (old style, with mechanical shutter), Optec SSP-3 solid-state photometer with BVRI filters, Optomechanics Research Model 3C grating spectrograph, objective grating, deep-cycle 12-volt battery with Hammond regulated power supply as charger, and several sets of star charts and books. We have constructed a set of four heavy-duty shipping cases, specially designed for the travelling telescope kit. We are also preparing instruction manuals, and outlines of some possible research projects which can be carried out with the telescope. The travelling telescope was displayed at IAU Colloquium #105 and at the 1988 IAU General Assembly, where it attracted much attention and useful advice. It will be ready for its first assignment early in 1989.

How the Telescope Will Be Used

The travelling telescope will be used primarily in conjunction with two existing programs of the IAU:

International Schools for Young Astronomers. At these intensive, three-week schools, the participants will be able to carry out useful astronomical observations with the telescope, under the guidance of the instructors. The planning, execution, reduction and interpretation of these observations can be incorporated into the daytime schedule of the school. Short projects can also be carried out.

Visiting Lectures Program. The travelling telescope will provide the host country with observational facilities over an interval of several months. Local astronomers can obtain hands-on experience with various astronomical techniques, and carry out research projects, perhaps in collaboration with one of the visiting lecturers.

By mutual agreement of the Canadian Commission for UNESCO, the University of Toronto, and the IAU, ownership of the telescope will be vested in the IAU, because of its administrative structure and its long-term commitment to improving the state of astronomy around the world. The specific assignments and itinerary of the telescope will be determined by IAU Commission 46: The Teaching of Astronomy. Countries or institutions wishing to use the travelling telescope should apply to the President of IAU Commission 46, who will consult with the Organizing Committee of the Commission, and with the co-ordinator of the travelling telescope project. If the application is approved, detailed arrangements for the shipping of the telescope will be made by the co-ordinator, in consultation with the applicant and the IAU Secretariat in Paris.

Acknowledgements. We are grateful to the UCAP Program of the Canadian Commission for UNESCO and of the Canadian International Development Agency for funding the travelling telescope project, and to the many organizations and individuals who have contributed significantly to the project in so many ways.

WHY DID MEXICAN ASTRONOMERS START WRITING BOOKS?

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Seven years ago, the great economic crisis Mexico is going through made it evident that students could no longer afford imported science books. Libraries were no longer selling books, and stopped ordering them, especially books edited in the USA. For the first time, Mexican editors came to Mexican scientists to ask them to write books, because even making translations of foreign books was getting too expensive.

The first book written by Mexican astronomers in recent years was a collection of astrophysical papers, intended for college physics students. It was edited by the National University. The quality of the papers was heterogeneous; nevertheless it was extremely important because it demonstrated that astronomers were capable of writing science books in Spanish.

After this, a collective astronomy book for children and a comic book followed; both were very successful and have since been revised.

A second collective book on astronomical topics by several authors intended for college non-science students was written, and after the previous experience it turned out to be extremely popular. Since then, a great number of books have been written by the 40 Mexican professional astronomers, including books on history, the solar system, binary stars, telescopes, quasars, black holes, cosmology, light etc. These books have been written for youngsters, general public and college students.

Most of the books written in recent years have been government-sponsored, which makes them extremely inexpensive as well as amply distributed. The format, of course, is very simple, unfortunately including very few or no colour photographs.

Relacion de Publicaciones del Instituto de Astronomia

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Un Universo en Expansion, Luis F. Rodriguez. La Ciencia/2 desde Mexico. 1985. Fondo de Cultura Economica.

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El Hombre de la Torre Inclinada, Irene Cruz Gonzalez, Abraham Nosnik y Elsa Recillas. Viajeros del Conocimiento. 1985. CONACYT y Gatopardo Editores.

De la Tierra al Cosmos, Astronomia para Ninos. D. Dultzin et al. 1984. CIDCLI.

El Cometa Halley, Miguel Angel Herrera y Julieta Fierro. 1985. Fondo Educativo Interamericano.

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Telescopios, Mauricio Tapia. 1986. SEP.

El Sol, Javier Gonzalez. 1986. SEP.

La Tierra, Miguel Angel Herrera y Julieta Fierro. Serie Nuestro Mundo. 1986. SITESA.

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El Cosmos, Miguel Angel Herrera y Julieta Fierro. Serie Nuestro Mundo. 1986. SITESA.

Las Estrellas, Miguel Angel Herrera y Julieta Fierro. Serie Nuestro Mundo. 1986. SITESA.

Anuario, Instituto de Astronomia, Revista Mexicana de Astronomia y Astrofisica, Instituto de Astronomia.

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Los Cuasares, Deborah Dultzin. La Ciencia desde Mexico. 1988. Fondo de Cultura Economica.

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A WORKSHOP FOR INSTRUCTORS OF INTRODUCTORY ASTRONOMY

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As is likely true at many institutions, the astronomy program at Tufts University is not particularly well-funded. We have no permanently mounted telescopes, rather we make do with portable equipment. Our urban location makes night-time observing difficult, so, in a sense, the portability of equipment is a bonus. We have no extensive plate collections, measuring engines, and the like, so we utilize either extant projects and exercises in astronomy, or develop our own. Moreover, from time to time persons from our physics department, who likely have not had graduate level training in astronomy, teach the introductory courses during the summer. These factors combined to suggest that there might be a clientele for a workshop for teachers of elementary astronomy courses who had not had professional training in the field and who came from institutions that did not have access to modern equipment or facilities for student instruction.

With funding from the National Science Foundation's program for the Enhancement of Undergraduate Faculty, we developed a two-week workshop, devoted primarily to problems of classical, optical astronomy. Our potential clientele were persons with a minimum of three years of college teaching experience who had never studied astronomy at the graduate level. In the limited time available during the spring, 1988, brochures were sent to some 200 institutions, primarily in the Northeastern United States. By the closing date for applications in May, we had had inquiries from about three dozen persons. The 20 selected for the program included 13 with Ph.D.'s, eight of which were in physics. About half were from junior or community colleges, the remainder from four-year institutions. In general, they were a well-educated group, eager to learn more about their adopted field.

In the majority of sessions, carried out during June 1988 at Tufts University, our intent was to minimize lecturing and maximize hands-on activities that simulate some of the steps an astronomer makes in reducing data and obtaining a result. To accomplish this, a variety of projects were used including many of the "Laboratory Exercises in Astronomy" from SKY PUBLISHING CORPORATION. But, beyond having participants work their way through the various exercises, we hoped to get them to think critically about what they were doing.

While some so-called laboratory exercises are quite complete, many can be improved. Not only are data frequently out of date, but accidental and systematic errors in the measurements are sometimes ignored. Participants were asked to think about such matters. For each of the activities he or she completed, the participant filled out a brief questionnaire evaluating the materials used and suggested improvements. An opening discussion of errors and correlations set the stage for such topics as: galactic structure including a determination of the distance to the galactic center and the delineation of spiral structure from the distribution of early type stars and radio observations of neutral hydrogen; the distance to the Hyades by a variety of methods including use of the convergent point, dynamical parallaxes, main sequence fitting, mean parallaxes; distances of galaxies from observations of Cepheid variables, the rate of decline of novae; the Hubble Law; and mass determinations of planets, binary stars, and the Andromeda galaxy.

A very popular presentation on astrophotography was followed that evening by an observing session including hands-on demonstrations of portable equipment during which all obtained photographs of the moon. A session on the work, facilities, and assistance available from the American Association of Variable Star Observers was followed with a variety of projects related to variable stars including light curve plots and period determinations. Other lecturers covered such topics as cosmic strings, neutrinos, image reconstruction, and radio astronomy following a field trip to a nearby facility.

In addition, a morning was devoted to participants describing one or more activities for their students. These included trips to solar eclipses to photograph the flash spectrum and corona; the construction and use of a seismograph; the analysis of images obtained from earth satellites to identify potential prehistoric impact craters; and methods of introducing some mathematics into introductory courses.

Quite generally, participants felt that their experience had been very worthwhile. Many mentioned the variety of materials and resources they had been exposed to. But one lamented: "Somehow I did not learn as much astronomy as I had hoped... I would have needed a few days reviewing math before coming here..." As for what was lacking--the most commonly expressed desire was for more activities involving the use of telescopes and more night sky viewing.

WORLD'S ASTRONOMY EDUCATORS GATHER AT WILLIAMSTOWN

Jay M. Pasachoff
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"The Teaching of Astronomy", IAU Colloquium 105, brought 162 participants to Williamstown, Massachusetts, during 26-31 July. Attendees came from 31 countries on six continents. The meeting celebrated the 150th anniversary of Williams College's Hopkins Observatory, the oldest extant astronomical observatory in the United States.

IAU Colloquium 105 unified several strands of astronomy education, including teachers at schools, colleges, and universities; authors of textbooks and of popular books; planetarium staff, popularizers on television and radio; developers of teaching-training programs, and those developing computer and other materials for teaching astronomy. John R. Percy of the University of Toronto, Canada, chaired the Scientific Organizing Committee and this writer, who is the U.S. national representative to Commission 46, chaired the Local Organizing Committee. The meeting was sponsored by IAU Commission 46 on the Teaching of Astronomy. Cecylia Iwaniszewska of Poland, Chair of Commission 46, welcomed the group.

A theme of the meeting was the spread of astronomy through the developing countries. Feng Ke-Jia of China, Teresa Lago of Portugal, and J.V. Narlikar of India participated in a panel on the curriculum for the training of astronomers around the world. Also, A. Aiad of Egypt, H.S. Gurm of India, Y. Vanichai of Thailand, and G. Vicino of Uruguay described the state of astronomy education in their countries. Silvia Torres-Peimbert of Mexico moderated another panel, consisting of Sam Okoye of Nigeria, Mazlan Othman of Malaysia, Alexis Troche-Boggino of Paraguay, and Luis Rodriguez of Mexico, that discussed the needs

of the developing countries. They concluded that there is a general lack of prepared astronomers in addition to material resources such as libraries and instruments.

The meeting heard about many projects that are already under way. M. Gerbaldi, L. Bottinelli, and L. Gouguenheim of France discussed their "Comite de Liaison Ensignants Astronomes (CLEA)", and Phil Sadler and Darrel Hoff of the United States discussed Project STAR ("Science Teaching through its Astronomical Roots") and the materials it is developing. The question of how much so-called geometrical astronomy should be taught, given the general lack of understanding by students of such basic material as the reasons for the seasons, was discussed, for the time allotted to such teaching necessarily subtracts from time allotted to more astrophysically oriented topics.

Owen Gingerich (U.S.) gave an illustrated lecture on astronomy textbooks through the ages, including Copernican times, and Norman Sperling (U.S.) discussed that country's introductory textbooks since the 19th century. Sperling showed graphs of the relative amounts of material in different categories over time, such as the sharp decline in the positional astronomy category relative to stellar astrophysics over the last century.

Exhibits and poster sessions included 165 items from the Astronomical Society of the Pacific and a display of The Travelling Telescope, a project of Commission 46. An 8-inch telescope equipped with a spectrograph and photometer is available for periods of up to several months.

Participants in the Colloquium enjoyed the rolling countryside of New England's Berkshire Mountains. The Clark Art Institute and the Chapin Library of Rare Books arranged a special exhibition, "Urania Observed", of prints (by Trouvelot and others), paintings of Donati's Comet and other subjects, rare books (Bode and Bayer atlases, for example), and objects such as a 19th century silver tankard that is engraved with planets and a comet. The final day ended with a concert of the Boston Symphony Orchestra at their summer home, Tanglewood. Percy and Pasachoff are editing the proceedings for Cambridge University Press.

Support for Colloquium 105 came from the Perkin-Elmer Corp., the U.S. National Science Foundation, the IAU, The Royal Astronomical Society, The Royal Astronomical Society of Canada, and the American Association of Physics Teachers.

Editor's Note: This article is reprinted from **IAU Today**, the daily newspaper of the 1988 IAU General Assembly in Baltimore.

ASTRONOMY EDUCATIONAL MATERIAL IN DEVELOPING COUNTRIES

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How can institutions in developing countries obtain the textbooks, monographs and journals which they need for the teaching of astronomy - at all levels - and for the training of astronomers? The following summary is based on a panel discussion and on a lengthy open discussion at IAU Colloquium #105 (The Teaching of Astronomy), held in Williamstown USA from July 27 to 30, 1988.

1. Acquiring Current Material from Abroad

Current monographs and journals are essential for graduate teaching and research, and for the "professional development" of instructors, but there are major problems due to currency shortage or restrictions. Institutions must therefore be particularly selective in choosing material. IAU Commission 46 produces a triennial listing of astronomy education material in all major languages, to help to deal with this problem. This publication is constantly being modified in order to provide the most useful information to all those who may need it, in the appropriate language and format. Institutions in developing countries can obtain some periodicals through exchange with institutions elsewhere, but problems of language, content and shipping costs make this difficult. Some authors and publishers are willing to donate material to needy institutions; IAU Commission 46 should encourage this, and facilitate it by maintaining a list of such institutions. Another approach might be to "twin" institutions in the developing and the developed countries.

2. Acquiring Less-Current Material from Abroad

Several organizations are now engaged in collecting unused books and journals, and sending them to developing countries. Shipping costs are a problem, but are covered in many cases by government agencies or by scientific or educational societies. IAU Commission 46 should encourage such efforts, and co-ordinate them by publishing lists of potential donors and recipients in its newsletter, and possibly by setting up a central "clearing house" for donated material. Publishers might also be induced to donate material, such as slightly-outdated editions of textbooks. In North America, new editions of introductory astronomy textbooks are introduced approximately every three years!

3. Producing Translations of Important Material

Translations of important and popular material could be made in the language of the developing country (and then shared by other countries with the same language). This makes good use of good material, but requires the co-operation of the author and publisher of the original edition. It also requires a good translator, who is willing to do it as a "labour of love": there is not much profit to be make in translating the average astronomy book! In the case of elementary and secondary school textbooks, there may be a larger market, but there are also additional problems. The book may have to be translated into several local languages (the example of India was quoted). Most school textbooks are written for a specific curriculum, which is far from standard from country to country. IAU Commission 46 might consider developing a standard curriculum, and producing resource material to accompany it.

4. Reprinting Material Locally

With the co-operation of the author and publisher of the original edition, certain books and journals could be reprinted locally, to take advantage of lower labour and shipping costs. These low-cost editions could then be used in other developing countries. Some projects of this kind have been undertaken by organizations such as UNESCO. IAU Commission 46 could help to identify suitable material for local reprinting, and encourage publishers to co-operate.

5. Reprinting Material Locally, with Modifications

One problem with acquiring or reprinting "foreign" material is that such material may not reflect the cultural and scientific environment of the developing country. This is particularly true for popularizations and for school textbooks. With present developments in electronic or "desktop" publishing, however, it may be possible for an author or publisher to provide the text and illustrations for a book in electronic form. These could then be modified to fit the local environment, and printed locally in order to take advantage of lower labour and shipping costs.

6. Local Authorship and Publication

As a developing country evolves into a developed country, the ultimate goal might be to produce all educational material locally. During the transitional phase, this is probably feasible only for standard textbooks. The few potential authors of such books are usually overloaded with the task of developing the local astronomy education system, and local publishers are reluctant to produce books for a limited market. Perhaps the IAU would be willing to underwrite such publication. IAU Commission 46 could also help by compiling a list of photographs and other diagrams which would be available, free of charge, to publishers in developing countries, or by convincing publishers of textbooks in the developed world to provide plates from slightly-outdated editions.

A WORD OF WELCOME FROM THE PRESIDENT

Aage Sandqvist
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I should like to take this opportunity to welcome the new organizing committee, the national representatives, the regular members and the non-IAU members, - old and new - to the activities of IAU Commission 46 during 1988-1991. Please feel free to communicate with me at any time at the above address or by electronic mail at enea!sleipner!sandqvis through the uucp network. This goes of course for all readers of this newsletter. I am interested in all your viewpoints that might affect the functions of the commission.

This period, 1988-1991, is one of change for our commission. Not only does the period begin with a change of statutes which more clearly defines the roles of national representatives and opens the commission to more regular members, but our activities are being expanded and vitalized. For example, the impact of the new Travelling Telescope (TT) on the already existing International School for Young Astronomers (ISYA) or the Visiting Lecturer

Program (VLP) is yet to make its mark. We also have plans to change the profile of the Astronomical Educational Material (AEM) so that in the future it will consist of critically selected material in four languages: (A) English, (B) Russian and (C) French and Spanish.

As we have seen over the past couple of years, the world seems to have been struck by a peace-bug. This promises to lead to a better contact and understanding between the people of the nations. What better way to encourage this process than to ease the mobility of students from one educational system to another. As we concluded in Baltimore, the diversity of the world's educational system is one of its strengths, as in Nature itself. We should therefore not try for conformity but rather for a fair table of transforms between the different systems, so that students may freely move between them without serious loss of time. Examples of such beginning processes exist in Europe through the ERASMUS (the European Community Action Scheme for the Mobility of University Students) and the EADN (the European Astrophysical Doctoral Network). But these embryo processes should be expanded to include all continents. Perhaps IAU Commission 46 has a role to play here.

I should like to round off this brief message with an expression of sincere thanks to the departing president of our commission, namely Dr. Cecylia Iwaniszewska, for the warmth and energy that she has exuded so generously in leading us through the past triennial period.

NOTES FROM THE EDITOR

There is much to be gained if astronomical organizations in the developed countries can send astronomy education material to the less-developed countries. But where can one start? There are so many deserving institutions in these countries. One solution is to send material to institutions in which Visiting Lecturers' Programs are taking place, or in which International Schools for Young Astronomers have been proposed. Four such institutions (and their "contact persons") are the following:

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ASUNCION
Paraguay

Professor Maria Luisa Aguilar
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Dr. Oscar Alvarez Pomares
Inst. Geofisica y Astronomia
Calle 212 #2906
Entre 29 y 31, La Lisa
CIUDAD HABANA
Cuba

Dr. Mazlan Othman
Department of Physics
National University of Malaysia
Bangi, Selangor
Malaysia

I am pleased to say that two astronomical organizations in which I am active have agreed to send their publications to these four institutions. As other VLP's and ISYA's are planned, it may be possible to add other institutions to this list. I encourage other organizations to send their publications and/or astronomy education material to these institutions.

The Harvard-Smithsonian Center for Astrophysics has recently produced an excellent set of 175 35mm slides on such topics as NASA's "Great Observatories", the universe at many wavelengths, and high-energy astrophysics with an accompanying book of captions and explanations. The Center has agreed to make 20 or more sets available to institutions in the developing countries. The president and organizing committee of IAU Commission 46 will provide a list of the highest-priority institutions. We are very grateful to James Cornell and Christine Jones of the Center for Astrophysics, for making this arrangement possible.

One proposed "solution" to the problem of transferring resources such as astronomy education material from the developing countries to the less-developed countries is by "twinning" institutions in these two areas. Commission 46 would be interested to hear your reaction to this suggestion.

I have had some interesting correspondence with Zdenek Urban, Astronomical Institute, Slovak Academy of Sciences, 05960 Tatsanska Lomnica, Czechoslovakia, regarding education matters. He has sent me an interesting reprint on "Stars in the Teaching of Astrophysics at Grammar Schools" by V. Stefl from a Czechoslovak journal (but in the English language). Either he or I could send you a copy if you are interested.

Harry J. Augensen, Department of Physics, Widener University, Chester, PA 19013, USA, has written to say that he and Wulff Heintz of Swarthmore College are translating the new fourth edition of Handbuch fur Sternfreunde from German into the second English edition of Astronomy: A Handbook. The last chapter covers astronomy education, and will list (among other things) education aids and resources which are widely available.

I have received a copy of Astronomie in der Schule, an excellent German language publication (ISSN 0004 6310) available from Gehruder Petermann GmbH, Kurfurstenstrasse 111, 1000 West Berlin 30, Federal Republic of Germany. This journal contains short articles on a variety of topics of interest to knowledgeable astronomy teachers.

I am pleased to report that Ottawa, Canada, is playing host to the 1989 Conference of the International Council of Associations for Science Education (ICASE), from October 18 to 21, 1989. The host organizations are the Science Teachers' Association of Ontario (of which I am honorary president) and L'Association des Professeurs du Sciences du Quebec. Delegates are expected from many countries, and the program looks excellent. For more information, write to the conference office at Room 117, 41 Louis Pasteur, Ottawa, Ontario, Canada K1N 6N5.

Multilingual Dictionary of the Space Sciences

Dr. Josip Kleczek has requested the assistance of members of Commission 46 in the checking of the copy and proofs of his multilingual dictionary which will be published in four volumes by the Czechoslovak Academy of Sciences and the Elsevier Science Publishers (The Netherlands). The languages concerned are English, French, Spanish, German, Portuguese and Russian. Each volume is divided into 18 or 27 sections as shown overleaf and has a basic thematical part and alphabetical indices. Copy for Volumes I and IV is already at the printers, and Dr. Kleczek expects to send copy for Vol. II by the end of 1988 and for Vol. III by July 1989. Proofs of Vol. I should be available in October.

Anyone who is willing to help is asked to write to Dr. Kleczek and to indicate the sections and language of interest. He estimates that the time required per section will be about 20 minutes, but I suspect that the time "to correct and complete the terminology" will be longer even though "all the terms in all the languages have already been checked separately - but never in relation to other languages". Dr. Kleczek will check the indices himself. His address is: Astronomical Institute, 251 65 Ondrejov, Czechoslovakia, Telephone: Praha 72 45 25, Telex: 121579. I am sure that any help that you can give him will be much appreciated and will be of benefit to the whole astronomical community.

The list of sections is given on page 16.

Update on the Books and Journals Programme of the Canadian Astronomical Society (CASCA)

A year ago in this newsletter we launched a programme for passing on surplus astronomical books and journals to institutions having a need for them. We have received a fair number of responses to our invitation, and have sent or are in the process of sending material to Bulgaria, Poland, Egypt, India (2x), Nigeria, and Argentina.

We would like to acknowledge your responses and thank you for your interest. We regret that in some instances our own response has been slow, and to some more recent requests we have not yet replied. We expected this, because we are only two people looking after not only the correspondence involved, but also the collecting, listing, binding (where applicable), and shipping of the material we receive. If you have written, or are awaiting a shipment, receive our assurances that you will hear from us in due course. As we gain more experience, we hope to become more streamlined.

We continue to invite inquiries. Please write to one of us below for our current listing of journal runs, textbooks, and in more limited number, monographs on astronomical and astrophysical subjects.

Alan H. Batten
Dominion Astrophysical Observatory
5071 West Saanich Road
Victoria, British Columbia
Canada
V8X 4M6

Dieter Brueckner
Department of Astronomy
University of Toronto
Toronto, Ontario
Canada
M5S 1A7

List of Sections of Multilingual Space Science Dictionary by J. Kleczek

Volume I

0 RADIATION (pp. 375)
1 el-mag radiation
2 radiometry
3 imaging
4 telescope
5 photography
6 spectrography
7 spectrum
8 radio radiation
9 corpuscular radiation

10 MATTER (pp. 157,
11 elementary particles
12 interactions
13 atomic nucleus
14 atom
15 elements
16 molecules
17 macroscopic properties
18 plasma
19 magnetized plasma

Volume II

20 MOTION (pp. 230)
21 coordinates
22 position
23 position determination
24 time
25 heat
26 flow
27 mechanics
28 orbits

30 SPACE FLIGHT (pp. 107)
31 launch
32 guidance
33 flight
34 power supply
35 tracking
36 altitude
37 descent

40 DATA (pp. 232)
41 observation
42 measurement
43 remote sensing telemetry
44 data processing
45 mathematics
46 geometry
47 statistics
48 publication

Volume III

50 SPACE TECHNOLOGY (pp. 252)
51 materials and structures
52 automation
53 balloons
54 rockets
55 propulsion
56 space flight center
57 space vehicles
58 satellites
59 space allocations

60 SPACE RESEARCH (pp. 280)
61 mission
62 space cabin
63 space research
64 space astronomy
65 space biology
66 space medicine
67 exobiology
68 space law

Volume IV

70 EARTH SCIENCES (pp. 150)
71 space geodesy
72 geophysics
73 seismicity, volcanism
74 geology
75 geomagnetism
76 atmospheric sciences
77 weather
78 ionosphere
79 atmospheric optics

80 SOLAR SYSTEM (pp. 303)
81 selenography
82 selenology
83 planets, planetary cosmogony
84 interplanetary matter
85 comets
86 meteors
87 meteoroids
88 the Sun
89 solar activity

90 DEEP SPACE (pp. 231)
91 stars
92 constellations
93 stellar structure
94 stellar evolution
95 variable stars
96 stellar systems
97 interstellar space
98 galaxies
99 universe