

# INTERNATIONAL ASTRONOMICAL UNION

## COMMISSION 46 — TEACHING OF ASTRONOMY

### NEWSLETTER

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Number 29: February 1990

#### Editorial

In North America (and probably elsewhere), there is increasing concern about the quantity and quality of science education in the schools. Governments are promising to take action, but it is not clear whether they are willing or able to do so. Many professional scientific associations are becoming more aware of and concerned about this problem, and this trend should be encouraged.

One useful strategy would be for every national and international scientific association to incorporate educational activities - for teachers and the public, as well as for professional scientists - as part of its regular scientific meeting. These educational activities could take one or more of several forms:

1. Workshops for schoolteachers, modelled on the traditional one-day meetings between teachers and astronomers which precede every IAU General Assembly.
2. Major public lectures, such as the annual Helen Sawyer Hogg Public Lecture co-sponsored by the Canadian Astronomical Society and the Royal Astronomical Society of Canada (RASC), or the one-day Centennial Symposium to be held at the RASC General Assembly in Ottawa on June 30, 1990.
3. An evening of brief presentations by several outstanding scientists, to convey the essence and excitement of their research to an audience of students, teachers, and the general public.

If you think that this is a worthwhile idea, why not write to your national associations of astronomers, biologists, chemists..... and suggest that they use these and other strategies to help to increase the level of public awareness and understanding of science and technology.

John R. Percy

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Do we need a Journal for the Teaching of Astronomy? I am sure that this topic will be discussed at the next IAU General Assembly - it always is. Personally, I do not think that we have the human or financial resources. If this Newsletter is simple and inexpensive, it can be sent to all countries, free of charge. Besides, most papers on astronomical education will still be published in other places. In the meantime, please send contributions to this Newsletter (brief articles, notes, reports, news items, abstracts of papers published elsewhere) to me at any time - please! - JRP

## EDUCATION PROGRAMS OF IAU COMMISSION 46: THE TEACHING OF ASTRONOMY

### XVIth IAU-UNESCO INTERNATIONAL SCHOOL FOR YOUNG ASTRONOMERS

Josip Kleczek  
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The School took place in the Instituto Superior Pedagógico, Holguín, Cuba, from August 2 to 19, 1989. Lectures (95 hours total) were presented by five professors from abroad (Argentina, Brazil, Czechoslovakia, Federal Republic of Germany and Mexico) and by five professors from Cuba.

Information on the organization of the School was sent well in advance to many institutions and universities in all Spanish and Portuguese-speaking countries. Participants came from: Argentina (1), Brazil (3), Cuba (32), Colombia (2), Spain (9) and Venezuela (8). Several more participants (such as professors of physics) attended only some lectures. The young astronomers who participated actively in all the School activities received a diploma.

The School received all possible support and help from the Instituto Pedagógico in Holguín, from the Local Authorities, from the Cuban Ministry of Education, and the Cuban Academy of Sciences. The cordiality with which all the participants were received will never be forgotten. Many Cuban colleagues put a great deal of effort into the preparation and realization of the School. All the personnel who assisted (secretaries, drivers, cooks, janitors), did so cheerfully and immediately - not "manana" - wherever help was needed.

The results of the School may be summarized as follows:

- transfer of knowledge to the younger generation
- resolving of problems which were raised by the young participants
- personal acquaintances and friendship between all the participants, which form a solid basis for future collaboration in Latin America and Spain
- considerable increase of prestige of astronomy in Cuba: professors gave several popular talks on various subjects on Cuban TV and radio, and contributed to newspapers
- impetus for astronomy teaching, not only in Cuba but in Latin America in general

The results of the School were worth the great efforts of our Cuban colleagues, the money contributed by the Cuban authorities and by the IAU, and the many hours which the professors spent in preparing their lectures.

### XVIIth IAU-UNESCO INTERNATIONAL SCHOOL FOR YOUNG ASTRONOMERS

From the June 1989 Bulletin of the IAU

The XVIIth IAU-UNESCO ISYA for young astronomers from Southeast Asia will be held by the Institute of Physics of Malaysia at the Marine Academy, Melaka, Malaysia, from May 28 to June 15, 1990. The language will be English. Topics to be covered are: Stellar Astronomy, Galactic Astronomy, Solar Physics, Modern Astrophysics, Positional Astronomy, and Instrumentation of Small Telescopes. There will be practical training and seminars on selected topics. The Director of the School is Dr. Mazlan Othman, University Kebangsaan Malaysia.

## VISITING LECTURERS PROGRAM FOR PARAGUAY

Alexis Troche-Boggino  
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"Galaxias y el Universo", the third IAU Visiting Lecturers Programme (VLP) in Paraguay, has been a success. This course has been taught by Dr. José Luis Sérsic, a well-known extragalactic astronomer and experienced professor from the Universidad Nacional de Córdoba, Argentina. Topics about the Galaxy, normal and active galaxies, and some introductory cosmology were included in 24 lectures delivered twice a week at the Instituto de Ciencias Básicas, Universidad Nacional de Asunción. The course began on August 18 and ended on November 14, 1989.

Three practical laboratory exercises were requested of all participants. For instance, samples of films from the ESO-SERC Atlas were used to find positions and morphology of galaxies, and to identify some clusters of galaxies. Another exercise involved a study of the bulge and disc components of a galaxy using its intensity-vs-distance curve, which was determined from photometric data provided from an astronomical journal. Dr. Sérsic was very careful to find problems which could be solved with the limited available tools, and those which were appropriate to the students' background of knowledge. He therefore introduced them to the realm of the Personal Computer. He showed them how to use a model of our galaxy - called "Moreví Rapé", which means Milky Way in Guarani, our native language. The students learned about orbits by watching "stars" moving on the screen, and looking for periodic orbits etc. We tried hard, and were finally fortunate to have the loan of an Apple-compatible computer for a short time.

There were 17 participants, including juniors and seniors from the Physics Department, Instituto de Ciencias Básicas, Universidad Nacional de Asunción, four engineering students from the Facultad de Ciencias y Tecnología, Universidad Católica de Asuncion, and two invited students from the Club de Astrofísica del Paraguay. These invited students have been very helpful to the VLP instructors. In particular, Senor Eduardo Parani has provided his amateur astronomical observatory, maps and some tools for the practical exercises of the course. He also offered accommodation at his country house for all VLP instructors - and good gastronomy too!

Lectures lasted about 90 minutes, and the average student attendance was 12. Most of these students passed the course, and three of them received excellent marks. All of them have a very busy class schedule. They made extra efforts to find time, and in some cases to travel some distance, to attend the VLP course.

Dr. Sérsic's course was the only one given last year. Another, in Optics and Instrumentation for Astronomy, is expected next April. Dr. Jorge Sahade, who is the head of our VLP Coordinating Committee, is doing his best to find a suitable instructor for it.

The IAU Travelling Telescope is a "must" for this course. Unfortunately, the time of the VLP trimestral course does not fit the 1990 schedule of the Travelling Telescope, because it is scheduled to travel to the ISYA in Malaysia this year. Perhaps it would be possible to send some of the instruments of the Travelling Telescope (such as the photometer or spectrograph) and use them on Señor Parini's Celestron-8 telescope, which is similar to the Travelling Telescope. I emphasize the importance of having these astronomical tools in a country with no astronomical observatories except amateur ones. It is the instrumental and practical side of the science which is most relevant to our

decision-makers to open their minds, and to students to help them to learn by "getting their hands dirty". This is perhaps a very much-needed turning point in order to have a bright future for Astronomy in Paraguay.

#### THE TRAVELLING TELESCOPE

John R. Percy  
University of Toronto

As mentioned above, we plan to send the Travelling Telescope to the International School for Young Astronomers, in Malaysia. Air Canada has generously provided free transportation for the telescope and its technician to go to Singapore, which is the nearest Air Canada destination to Malaysia. The telescope will spend several weeks in Malaysia before returning to Canada.

We are also seeking funds from corporations and foundations, in order to transport the telescope and its technician to future destinations.

#### PROCEEDINGS OF IAU COLLOQUIUM #105: THE TEACHING OF ASTRONOMY

The Proceedings were printed in late 1989, and officially published in January 1990 by Cambridge University Press. The book made its public "debut" at the Cambridge University Press exhibit at the 1990 Winter Meeting of the American Astronomical Society in Washington. The press has done an excellent job of producing the book, for which the editors (Jay Pasachoff and I) are most grateful. The list price of the book is \$54.50 US (hardcover), which is a most reasonable price for a book of its type, quality and length. We hope that you and your library will order copies, and recommend it to your contacts in astronomy education.

#### FIFTH ASIAN-PACIFIC REGIONAL MEETING OF THE IAU

Syuzo Isobe  
National Astronomical Observatory  
Mitaka, Tokyo 181  
Japan

The Fifth Asian-Pacific Regional Meeting of the IAU will be held near Sydney, Australia, from July 16 to 20, 1990. Dr. B.L. Webster, the Chairman, has arranged for two 90-minute sessions on astronomical education, of which one session will be a parallel one. The following arrangement of the sessions is proposed:

1. General session (90 minutes)

- 2 30-minute invited talks, one a research report, and the other a national report
- 10 3-minute talks from poster papers

2. Parallel session (90 minutes)

- 3 10-minute talks from poster papers
- 60-minute discussion on future work in astronomical education in the region

3. Poster session: many poster papers!

I hope that many poster papers will be presented at the meeting, and that you will encourage colleagues in your country to present such a paper.

## ASTRONOMICAL EDUCATION AROUND THE WORLD

Syuzo Isobe has sent some interesting information about astronomical education in Japan and in the Asian-Pacific region in general.

The Proceedings of the Third Meeting on Astronomical Education in Japan includes an impressive list of 64 papers on all aspects of the teaching of astronomy.

Dr. Isobe plans to publish the first edition of the Bulletin of the Teaching of Astronomy in the Asian-Pacific Region. Some articles have already been submitted. Additional articles would be welcomed by Dr. Isobe at any time.

Dr. Isobe also reports that Dr. Il-Seong Nha has recently sent him two textbooks including astronomy used at the school level in Korea. Dr. Isobe is building up a collection of textbooks including astronomy used at the school level, so that he can build up a wide-ranging international set of textbooks, and can lend them to people who are interested in a comparison of textbooks.

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Dr. Teresa Lago (Universidade do Porto, Portugal) reports that the Centro de Astrofisica is now in operation. Dr. Lago and her colleagues have worked hard to establish this centre for astronomical education and research, and we congratulate them on their progress. The centre has moved to a new building, and is now installing the computer and terminals, the library and the people. The first visitor was Dr. Derek McNally, General Secretary of the IAU, who was in the country on IAU business, and has now inaugurated the centre's lecture series.

If you plan to be in Portugal, I am sure that Dr. Lago and her colleagues would appreciate a visit (and a lecture) from you.

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The permanent seminar on astronomy at the Institut de Ciencies de L'Educacio of the Polytechnic University of Catalonia is preparing its fourth meeting on the Teaching of Astronomy at the Secondary and Primary Levels, to be held in the first fortnight of September 1990. The purpose of the meeting is to facilitate interchange of experiences, and of future plans about education in astronomy, as well as to discuss programming themes, didactic and practical work etc. For further information, and definite dates of the meeting, write: Carmen Cervantes/Dr. Rosa M. Ros, Seminari Permanent d'Astronomia, ICE de la Universitat Politecnica de Catalunya, Diagonal 647, planta 11, 08028 Barcelona, Spain.

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The Vatican Observatory announces a Summer School in Observational Astronomy and Astrophysics, to be held at Castel Gandolfo, Rome, Italy from 11 June to 11 July 1990. The school is intended for students in the upper levels of undergraduate study or in the beginning years of graduate study, who have mastered the fundamentals of astrophysics and are considering the possibility of a future career in astronomy or astrophysics. Twenty to 25 students will be accepted, and about a third will be chosen from the non-industrialized countries. These students will receive scholarships to cover at least 75% of their expenses including travel.

The deadline for applications has passed, but further Summer Schools will likely be held in the future. The Vatican Observatory, and all those who plan and lecture at its summer schools, are to be congratulated on this interesting and worthwhile program.



## FROM THE ASTRONOMICAL SOCIETY OF THE PACIFIC

The Astronomical Society of the Pacific, a non-profit scientific and educational society is a leading source of materials for the teaching of astronomy. For a copy of their current catalogue, or for information about the items mentioned below, write to: ASP, 390 Ashton Avenue, San Francisco CA 94112, USA.

### A Workshop on the Teaching of Astronomy

A credit workshop on the teaching of astronomy in grades 3 through 12 will be offered July 14-15, 1990 at Boston University as part of the 102nd Annual Meeting of the ASP. The weekend program is designed to give teachers at all levels the information, resources, and activities which they need to include more astronomy and space science in the classroom. The organizers particularly want to encourage teachers who do not have a strong background in science to participate.

### A New Slide Set on the Solar System

A new set of 100 colour slides showing the best images of the solar system available today has just been released by the ASP. Assembled under the guidance of noted planetary astronomer David Morrison, the set includes recent Voyager views of Neptune, dramatic computer-processed views of Venus' surface from the Soviet landers, the close-up of the nucleus of Halley's Comet, and new computer simulations of the Pluto-Charon system.

For each planet and major satellite, Dr. Morrison has selected the most important and beautiful photos taken by such spacecraft as Viking, Mariner, Voyager and Venera. The slides are accompanied by a book of detailed non-technical captions, extensive background information, data tables, class or home activities, and a thorough reading list - everything you need to help put together an up-to-date and authoritative tour of our cosmic neighbourhood.

The price of \$99.95 US includes shipping and handling.

### The Heavens on Tape

Have you ever been on a camping trip and wished you had an astronomer along to point out the constellations and fill you in on the lore of the sky? Tapes of the Night Sky - two cassette tapes featuring "guided tours" of the heavens for each of the four seasons - is the next best thing.

Each half hour features basic, easy-to-follow instructions, together with interesting information about the astronomy and mythology of the objects which you identify. By relying on the brightest stars as guide posts, the tapes can help stargazers of all ages get to know the sky quickly and enjoyably. The tapes are accompanied by a booklet with the full script, four specially-designed star maps, and a beginning observer's reading list.

The price of \$25.95 US for the full set includes shipping and handling.

### Astronomy Newsletter for Teachers

This free newsletter for teachers and librarians in grades 3 through 12 is co-sponsored by several other astronomical societies. It includes short, non-technical articles on new developments, practical classroom activities, and specific suggestions for the best written and audio-visual resources on astronomical topics. No background in astronomy is assumed, and the sponsors particularly want to encourage teachers who have not had much training in science to become involved in the project.

To receive the quarterly newsletter, teachers or librarians should write to the ASP at the address above, on school stationery, and specify the grade level they teach.

## EDUCATION AT THE 175TH MEETING OF THE AMERICAN ASTRONOMICAL SOCIETY

I recently attended the 175th meeting of the American Astronomical Society, held in Washington DC from January 9 to 13, 1990. As usual, there were several papers and other activities dealing with astronomical education, though not as many as I would have liked.

### Astronomer for a Day

For the last several years, the AAS has preceded its meetings with a workshop in which local school teachers meet with professional astronomers. These workshops are much like the one-day meetings between teachers and professional astronomers which precede the General Assemblies of the IAU. In the AAS workshops, the teachers attend regular scientific sessions, social events, and special sessions designed to give information about current issues in astronomy. Professional astronomers - especially some of those giving invited lectures at the AAS meeting - give simplified, 20-minute presentations on their current research. The teachers also receive information and resource material which will help them to teach astronomy in their classrooms.

### Opportunities for High School Students

Herbert Gursky (Naval Research Laboratory) distributed an impressive list of opportunities for high school students in the Washington area (where 15 per cent of all US astronomers work) to gain direct experience in astronomy by working alongside professional research scientists. Research institutes in the area accommodate about 500 technically interested high school students during the year, with perhaps 100 working on astronomical projects. Many of these are paying positions. These programs seem to be effective and well-received by the students, and the scientists who employ them are happy to do so.

### CUREA: Consortium for Undergraduate Research and Education in Astronomy

CUREA is a consortium of academic institutions whose purpose is to bring undergraduate students and their faculty supervisors to Mount Wilson Observatory, which is now managed by the Mount Wilson Institute - a private foundation. Students from member colleges have access to the Snow horizontal solar telescope with its high-resolution spectrograph, to be used for research and education, and they will also be able to participate in ongoing research projects being carried out at Mount Wilson. There is hope that the 100" Hooker telescope will soon be reopened, and that CUREA members will play a role in using it.

Plans are in progress for CUREA to sponsor a two-week summer institute in 1990 to introduce selected undergraduate students to solar physics, and to the fundamentals of astrophysics and observational techniques.

### Astronomical Research in the High School Classroom

J.F. Lockwood (Sahuaro High School) and D.W. McCarthy (University of Arizona) described the advantages of doing original hands-on research in a high school classroom. During the past two years, materials were purchased to give sixty high school astronomy students an opportunity to do such work. For instance, a set of high-resolution photographs of Mars, which had not yet been fully analyzed, were studied. Crater counts, and their resulting R-plots, will be used to add to the body of knowledge concerning the relative ages of the surface features and regions of Mars.

The feasibility of doing research on a class scale rather than on an individual basis is clearly demonstrated by the quality and the quantity of student work. The fact that the original perception of students are changed by doing research is demonstrated by a before-and-after comparison.

This approach fills a major gap in the students' career education, and provides a much more accurate picture of what researchers actually do. For more information, you can write to Jeffrey F. Lockwood at 8125 E. 4th Place, Tucson AZ 85710, USA.

#### Another Research Experience for High School Students

In an earlier issue of this Newsletter, I described the University of Toronto Mentorship Program, which enables talented high school students to work on research projects with university faculty. At the AAS meeting, I presented a paper on "Period Changes and Evolution of RV Tauri Stars", with two high school students as co-authors. The paper gives a successful comparison of observed period changes in these stars, and period changes predicted by stellar evolution theory. For further information, write to me.

#### Low-Cost Astronomical Imaging

Three astronomers from the Western Research Company have developed a variety of image acquisition and processing systems, some of which are inexpensive enough (but still powerful and useful) for teaching laboratories and small observatories. The authors discuss educational applications, lesson plans for undergraduate or senior high school students, including both laboratory and observational exercises and data analysis.

#### Skywatch: A Television Program

Mary Kay Hemenway (Department of Astronomy, University of Texas, Austin) and her colleagues describe a weekly two-minute TV segment on astronomy, which they have produced for a local TV station. The segments were written, and visual materials chosen, by undergraduate astronomy majors. The TV studio provided production staff and narrator. These programs have generated tremendous public interest and attention. Suggestions on how to begin such a collaborative effort were provided by the authors.

#### Physical Models Do Help Students to Understand the Scale of the Universe

H.L. Shipman and J. Schmidt (University of Delaware) have introduced an exercise in which undergraduate non-major students produce a scale model of the solar system; the sun is represented by a 12-inch ball. By pre- and post-testing the students, the authors have demonstrated that the students who performed the modelling exercise developed a better understanding of the scale of the nearby universe than students who were given a traditional presentation of the structure of the solar system.

#### An Astronomy Summer Camp

From June 10 to 17, 1989, the University of Arizona held its second annual Astronomy Summer Camp. The participants were 33 boys and girls aged 12 through 16, from 15 cities in four states. This camp emphasized a "hands-on" approach to scientific exploration, and involved students in the process of research. Activities on the first three days were centered on the main campus, and used the local research facilities and planetarium. The last four days of activities occurred at the research observatories on 9100-foot Mount Lemmon. The camp was sponsored by the University of Arizona Alumni Association and was directed by astronomers from Steward Observatory, Flandrau Planetarium, and Pima Community College.

#### Astronomy for the Visually Impaired

Noreen Grice (Charles Hayden Planetarium, Boston MA 02114) described the use of tactile illustrations in the planetarium theatre, at first using plastic thermoform pages which were embossed individually by hand, and now with a Versapoint-40 printer, which produces tactile diagrams more efficiently.



## NEWS FROM URUGUAY

Gonzalo Vicino (A.N.E.P., Consejo de Educacion Secundaria, Casilla de Correo 10-987, Montevideo, Uruguay) recently sent me an interesting book by himself and his collaborators: "Hacia una Didactica de la Astronomia". A summary of the book is as follows:

Uruguay has the strange privilege of being one of the very few countries in the world in which astronomy is taught in its secondary schools, as part of the national curriculum. In this book, the fundamentals of its didactic methodology based on the concept of "active learning" is briefly explained. To accomplish this explanation, the actual teaching plan is presented as an example of the application of this methodology. The book also contains some short essays on planning and evaluation, and some suggestions about classroom work with adolescent pupils. The last part contains a guide to elementary instrument building, and the observations which constitute the "vertebral column" of this didactic methodology. The book also includes some tables and graphs which can help teachers to monitor the pupils' observations and to plan the practical work.

The book is 74 pages long, and includes many tables and diagrams. It would be of interest to anyone who teaches astronomy in the Spanish language. For more information, you can write to Professor Vicino at the address above.

## A PROPOSAL FOR A COLLOQUIUM

Gonzalo Vicino has also proposed a colloquium on "Astronomical Education in Modern Society" to be held in Montevideo (Uruguay) before or after the XXI General Assembly of the IAU to be held in Buenos Aires in 1991.

Possible topics to be dealt with are:

1. The role of science writers and journalists in modern society.
2. The creation of a planetary conscience based on the need to preserve the natural environment (ozone depletion, greenhouse effect, ocean pollution etc.).
3. The role of amateur astronomers in public education.
4. The teaching of astronomy in the primary and secondary schools.

The colloquium would be organized by an international committee and a local committee.

Montevideo has many attractive features, including very comfortable hotels with reasonable prices, excellent theatre shows and concert halls. It is the closest city to Buenos Aires (the site of the XXI General Assembly) - only a 20-minute flight away.

Those who have comments or suggestions about this proposal should write to Professor Vicino at the address above.

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Editor's comment: Although IAU Colloquium #105 (The Teaching of Astronomy) has only recently been held, it is the only IAU conference which has dealt solely with education. Clearly, there is a need for further conferences, in different parts of the world. Perhaps the Montevideo colloquium could replace the traditional one-day meeting between astronomers and teachers, which precedes each IAU General Assembly. I am aware of the work which is required to organize a major colloquium, and I wish Professor Vicino well.

## ROYAL ASTRONOMICAL SOCIETY OF CANADA CENTENNIAL

The Royal Astronomical Society of Canada has a long history, going back to 1868, when eight amateur astronomers founded an astronomical club in Toronto. An expanded group incorporated in 1890, and the name "Royal Astronomical Society of Canada" was adopted in 1903 with the permission of Edward VII. In the early years, meetings were held in the homes of members, but as the membership increased, the meetings were moved to the University of Toronto. In 1906, a branch was formed in Ottawa, and thus the idea of Centres of the Society came into being. There are now 22 Centres across the country, from coast to coast, and individual members in Canada and around the world, with a total membership of about 3 500. Members gather annually at a General Assembly, where interests are shared, objectives are set, and plans are made.

At the local level, the educational activities are many: regular lectures (mostly open to the public), star nights, instruction of groups such as Boy Scouts and Girl Guides, library programs (informal talks, displays, films, star nights), displays in shopping malls, International Astronomy Day programs, and cable TV programs. At the national level, the RASC publishes the Observer's Handbook, a highly-regarded annual observing guide, and the Journal of the RASC, with its regular "Education Notes" column. It co-sponsors the annual Helen Sawyer Hogg public lecture, and the Plaskett Medal, awarded to the author of the best doctoral thesis in astronomy at a Canadian university, and awards prizes to the best astronomy projects at the Canada-Wide Science Fair.

Amateur members of the RASC have made important contributions to astronomical research, having discovered several comets, made over a hundred thousand measurements of variable stars, and achieved international recognition for astronomical writing and photography. Together, the members of the RASC have been a major force in increasing public interest and understanding of astronomy in Canada. Their efforts have led to the establishment of several of Canada's observatories and planetariums.

The RASC is celebrating its Centennial with a special General Assembly in Ottawa, Canada's capital. The celebrations include a one-day symposium for the general public, featuring five outstanding Canadian astronomers. As a past president of the RASC, I am pleased and proud to see it reach this milestone.

John R. Percy

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## INDEX

XVIth IAU-UNESCO ISYA (J. Kleczek).....	2
XVIIth IAU-UNESCO ISYA (Bulletin of the IAU).....	2
Visiting Lecturers Program for Paraguay (A. Troche-Boggino).....	3
The Travelling Telescope (JRP).....	4
Proceedings of IAU Colloquium #105 (JRP).....	4
Fifth Asian-Pacific Regional Meeting of the IAU (S. Isobe).....	4
Astronomical Education Around the World.....	5
From the Astronomical Society of the Pacific.....	6
Education at the 175th Meeting of the AAS (JRP).....	7
News from Uruguay (Gonzalo Vicino).....	9
A Proposal for a Colloquium (Gonzalo Vicino).....	9
Royal Astronomical Society of Canada Centennial (JRP).....	10