JOINT DISCUSSION 4

CURRENT DEVELOPMENTS IN ASTRONOMY EDUCATION

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This Joint Discussion was sponsored by IAU Commission 46 (The Teaching of Astronomy), whose work affects and benefits all IAU members. The JD was chaired by Lucienne Gouguenheim and John Percy, who are grateful to the Organizing Committee of the Commission for their advice and assistance. The editor is especially grateful to Carolyn Moon, Erindale Campus, University of Toronto, for typing these proceedings quickly and carefully from a very heterogeneous manuscript.

In addition to the papers published here, there were papers by M. Othman (The Needs of 'The Lone Astronomer') and by N. Raghavan (The Role of Planetaria) for which manuscripts were not received. Two poster papers, by J. Matthews (on "Off-the-Shelf" Computer Software in the Astronomy Lab), and by Robbins (on Using Computers to Personalize a Large Class) were also presented as brief oral reports. A limited number of copies of the full proceedings of this JD, including discussion, and abstracts of the papers by Matthews and Robbins, are available from the undersigned.

John R. Percy, Editor

ASTRONOMY EDUCATION - AN OVERVIEW

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Each IAU member should be concerned about the quality of astronomy education, both in the schools and among the general public, because education plays a direct role in attracting and training new generations of astronomers; it contributes also to awareness, and understanding of astronomy among the taxpayers who support it.

Even more important than informing the taxpayer of the use made of his money, in terms of discovery and hot news, is the training of free citizens, having critical minds and able to ask themselves the right questions concerning the Universe in which they are living, and not only the practical and useful ones which the taxpayer has to ask. Facing the increasing complexity of modern science together with the dangerous growth of false sciences such as creationism, the astronomer remains a link between a rational thought process and the citizen. It is the aim of our commission to encourage this link.

I had the opportunity, one year ago, to take part in the "European Science Summit" organized in Brussels by the European Parliament. The organizer stated

I. Appenzeller (ed.), Highlights of Astronomy, Vol. 10, 145–176.

first that science and technology have played a significant role in establishing current levels of prosperity and well-being in Europe, and second that, in the present economic slow-down, research expenditure by governments and firms in Europe is tending to stagnate. It was one of the strong conclusions of the summit that education systems must both provide the scientific and technical training for future scientists and engineers and enable all citizens to meet the intellectual challenges which are linked to scientific and technological advances.

I took part in a panel discussion on "Science, Culture and Society", and I was amazed to discover how physics was considered by most of the members of Parliament as an extremely complicated science, no longer useful to teach, even in high schools. They did not understand the reason why I introduced myself as a physicist, because, as they told me, I had the privilege of being an astronomer... Clearly, astronomy appeared to them as a much more basic science.

Commission 46 is acting for the development of astronomical education at all levels, all over the world; it considers that one of its major duties is to contribute to the rise of astronomy in the developing countries. I refer to a paper published by Donat Wentzel in the issue #35 of the commission Newsletter, whose title was "Basic science in the developing world - access via astronomy". He sees several major roles of astronomy, and I quote here one of them which particularly struck me:

"Astronomy naturally provides broad access to an understanding of the nature of science and to the attitude of inquiry. Most people recognize in strange aspects of astronomy how science functions; everybody appreciates that the interpretations of our data are uncertain; nearly everybody recognizes the need for scientific debate; and most people realize that no so-called true answer will result from the debate. They expect merely a judgment that one interpretation fits the observations better than some other, with further observations to come. These are the essential qualities of science: thoughtful interpretation of data, argument and judgment about the most plausible interpretation, and readiness for improvement as time progresses."

This meeting is taking place nearly exactly 6 years after the IAU colloquium #105, organized by John Percy and Jay Pasachoff, which gathered a large number of astronomers for four days of papers, panels and discussions, and a worldwide inter-exchange of ideas and experiences about teaching processes.

Which new developments do we expect since that time? I give here some examples:

- In Sweden, the optional alternative course "Computing and Astronomy in the natural sciences" was introduced in 1990 at a secondary school, near Stockholm. It begins in Grade 11 with 3 weekly hours of computing, with examples taken from astronomy, and is followed in grade 12 by a course in general astronomy, 5 hours per week for the whole year. In addition, the student undertakes an astronomy project which takes 2 hours per week. This course is now considered to be a success and is attracting students from the greater Stockholm area.

- In Israel, a new centre for Science and Astronomy located in the Jordan Valley, next to the Sea of Galilee, serves the public in the northern part of the country. It operates a 14 inch telescope with electronic camera. Its activities include (1) group visits for observations and lectures (2) guidance and support for personal projects of high school students and (3) an outreach to the district with programs and courses for

children and for families.

- In Spain, the new reformed curriculum for high schools contains a compulsory subject about astronomy in the field of Natural Sciences, and there is also an optional astronomy workshop. Different regional, national and international conferences have been held.

- Poland has hosted two recent science education conferences and has opened a planetarium in the city of Torun.

- Bulgaria now has a separate astronomy course in grade 11 high school.

- In Rumania, astronomy has been reintroduced as a separate topic in high school and a competition has been open for writing new text books.

- In South Africa, within the turmoil of political events, astronomy is seen as an inexpensive way to "turn on" a multiracial population to the cultural and economic benefit of science.

- In Peru, the Boletin Informativo Seminario de Astronomia y Astrofisica for 1993 gives an impressive list of activities.

- In Malaysia, a new planetarium complex has been opened in Kuala Lumpur.

It was not possible to mention here all that is being done everywhere. How astronomy education is developing today worldwide, at school or in science centres, using new technology and new media, is discussed in the following contributions.

IAU PROGRAMS AND PROJECTS IN DEVELOPING COUNTRIES

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Projects for astronomically developing countries. The report on Commission 46 (Reports on Astronomy Vol. XXIIA, pp. 535-538, 1994) summarizes activities through 1993. Changes since then:

International Schools for Young Astronomers (ISYA): The 20th ISYA was held in Pune, India during January 3 to 21, 1994. There were 10 participants from India and 25 from 12 other countries. See Newsletter #39 (June 1994) of Commission 46 or the next IAU Bulletin. The 21st ISYA will be in Egypt during September 18 through October 8, 1994. There will be 20 participants from Egypt and 14 from 14 other countries (including 5 in Africa). The 22nd ISYA is likely to be in Brazil during 1995. We welcome additional applications for ISYA, but it should be understood that an ISYA is a significant commitment; the host country must pay for rooms and meals. The IAU provides travel cost, and its influence.

Visiting Lecturers Project (VLP): The VLP for Paraguay has been completed by