

COMMISSION 46: TEACHING OF ASTRONOMY (ENSEIGNEMENT DE L'ASTRONOMIE)

Report of Meetings held in Montreal

PRESIDENT: E. Kononovich

SECRETARIES: J. Pasachoff, A. Frankoni,
D. DuPuy, D. Wentzel

Session I, 14 August 1979

I. REPORT OF COMMISSION AND NATIONAL REPORTS

The President's report on Commission activities 1976 through 1978 was approved. National reports were received from 26 countries. The reports, together with analysis of the answers on a commission questionnaire and a short list of publications on astronomy education by commission members, are available from E. Kononovich. The length of the reports generally conformed to the decisions made in Grenoble.

II. MEMBERSHIP

With a view to avoiding proliferation of membership (see Grenoble report), the following was approved:

President: D. G. Wentzel

Vice-Presidents: L. Houziaux and M. Rigutti

Organizing Committee: W. Buscombe, C. Iwaniszewska, J. Kleczek, E. V. Kononovich (ex officio), L. Mavridis, S. E. Okoye, B. F. Peery, A. Ringuet.

National Representatives:

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| Argentina | Dr. A. E. Ringuet | Israel | Dr. R. Steinitz |
| Australia | Dr. A. W. Rodgers | Italy | Prof. E. Proverbio |
| Austria | Dr. H. F. Haupt | Japan | Prof. N. Owaki |
| Belgium | Prof. L. Houziaux | Korea (Rep.) | Prof. Kyung Loh Yu |
| Brazil | Prof. S. Ferraz-Mello | Mexico | Dr. S. Torres-Peimbert |
| Bulgaria | Dr. N. S. Nikolov | Netherlands | Dr. H. Hubenet |
| Canada | Dr. D. L. DuPuy | New Zealand | Dr. N. A. Doughty |
| Chile | Dr. H. Moreno | Nigeria | Dr. S. E. Okoye |
| Czechoslovakia | Dr. J. Kleczek | Poland | Dr. C. Iwaniszewska |
| Denmark | Dr. H. E. Jørgensen | Portugal | Prof. J. Osorio |
| Finland | Dr. K. Lumme | Roumania | Prof. N. Dinulescu |
| France | Dr. L. Gouguenheim | Rep. of S. Africa | |
| Germany DDR | Dr. H. Zimmermann | | Prof. A. H. Jarrett |
| Germany FDR | Dr. H. Scheffler | Spain | Dr. M. A. A. Catala-Poch |
| Greece | Dr. L. Mavridis | Sweden | Dr. Aa. Sandqvist |
| Hungary | Dr. M. Marik | Switzerland | Prof. B. Hauck |
| India | Dr. K. D. Abhyankar | Taiwan | Prof. Chun Shan Chen |
| Indonesia | Dr. B. Hidajat | Turkey | Dr. S. Hazer |
| Ireland | Dr. T. Kiang | | |
| United Arab Rep. | Dr. A. S. Asaad | U.S.S.R. | Dr. E. V. Kononovich |
| United Kingdom | Dr. D. McNally | Vatican City | Dr. J. Casanovas |
| U.S.A. | Dr. J. M. Pasachoff | Yugoslavia | Prof. Dr. F. Dominko |

Members: H.L. Andrillat, I. Atanasijevic, K.A. Barkhatova, V. Barocas, L. Bottinelli, H. Campins, S. Codina, J.M. Chamberlain, D. Clarke, E.A. Dibai, D.R. Fawell, M. Gerbaldi, N.P. Grushinski, A. Hayli, V.V. Ivanov, J.E. Kennedy, H. Lambrecht, J.C.D. Marsh, H.G. Miles, E.A. Muller, B. Onderlicka, W. Osborn, N.W. Ovenden, J. Percy, V.V. Porfirev, R.R. Robbins, A.E. Roy, T. Schmidt, B.M. Sevarlic, E.v.P. Smith, S.K. Trehan.

Consulting members: K.P. Addoli, M.L. Aguilar, J. Ebdon, F. Egger, D.M.J. Fubara, N.T. Jiwaji, D. Khaltar, T. Murtagh, F.N. Okeke, L.I. Onuora, K.A. Portzevskij, C. Roslund, E. Schmitter, J. Siroky, A.E. Troche Boggino, R.H. Wilkinson, D.V. Zaitschek.

We should make an attempt to find members from countries not represented on the commission. All interested persons are welcome at commission meetings and may request commission publications, such as the newsletter.

III. NEWSLETTER

Editor McNally reported that five newsletters have been published since the last General Assembly, starting in June 1977. They are published in June and December/January. The print run is about 300. McNally pointed to the developing controversy in the newsletter about Piaget. He hopes that more such controversy will develop.

Kononovich proposed that McNally continue as editor, a proposal that met with general approval. McNally thanked Wentzel and the University of Maryland for undertaking the production and mailing costs.

The members agreed with McNally that the newsletter is valuable. Schatzman said that the name "newsletter" is misleading, that it is more of a journal. He said "Sooner or later this will have to be turned into a journal." A journal on the teaching of physics is being launched in Europe. The "American Journal of Physics" already exists in the USA.

Excerpt from Discussion Paper: The prime aim of the Newsletter is to provide a means of communicating between members of the Commission and others interested in the teaching of astronomy. The newsletter is open to all IAU members to submit their ideas, suggestions and views concerning teaching of astronomy. The newsletter will remain interesting only if the contents become more international. The editor should actively seek guest editorials. Also, more contributions from commission 46 national representatives are greatly needed.

IV. RELATIONS WITH ICSU, UNESCO, COSTED AND OTHER BODIES

Report of L. Houziaux. The ICSU Committee for Teaching of Science met in Nijmegen (Netherlands) April 1978 and Paris, March 1979. It has issued a series of booklets "Learning Strategies in University Science", edited by D. McNally, since it appeared that university science teachers were less aware of many innovative schemes and ideas than their colleagues in other levels of education. Another series of 23 pamphlets, in preparation, concerns the cooperation between teachers of mathematics and teachers of other sciences. They are intended primarily for teaching of science at the school level. The Committee has also issued a Newsletter which reports on the activities of the teaching commissions of the various unions. Three have been issued; the second mentioned our newsletter. The Committee is also participating in the preparation of an international conference on Science and Society in order to show the contributions of science and technology to development in changing societies.

Sources: Learning Strategies in University Science, University College,

Cardiff Press, PO Box 78, Cardiff, United Kingdom; 9 pounds for all ten booklets.

Newsletter of ICSU Committee on Teaching of Science, also booklet "The Importance of Education and Training", 23 pamphlets when finished and Integrated Science Education Worldwide (\$5, report on International Council of Associations for Science Education, Nijmegen, 1978): Dr. John L. Lewis, ICSU-CTS, Malvern College, Malvern, Worcestershire, United Kingdom.

COSTED is concerned mainly with problems specific to developing countries. It holds seminars mainly in South East Asia and provides grants for scientists for science education purposes.

Houziaux thinks that it is important for the IAU to be represented in the ICSU committees in order to promote the teaching of astronomy among the various disciplines and to obtain the support of UNESCO for the various activities of commission 46. (See ISYA, below).

President Kononovich felt that the IAU and Commission 46 can be of great value to the other organisations. He recommended that Dr. Houziaux remain our representative. He asked Houziaux to give more frequent reports on the relations to the other organisations.

Session II, 18 August 1979

V. TEACHING SESSIONS AT REGIONAL ASTRONOMY MEETINGS

The following recommendation was sent to the Executive Committee:

Whereas the IAU supports the organisation of regional astronomy meetings, Commission 46 further recommends that the IAU urge the holding of sessions on the teaching of astronomy at such conferences. The members of Commission 46 are available to assist.

Such teaching sessions may well be specific to the main conference topic.

VI. INTERNATIONAL SCHOOLS FOR YOUNG ASTRONOMERS

The report of the school in Nigeria was circulated. During 1976-1978 two schools were held, in Brazil and Nigeria. Both were very successful and fully justified the support given by the IAU.

The ISYA in La Laguna, Tenerife, Spain from 10 to 22 September 1979 will be supported by IAU funds and by a UNESCO contract through ICSU, each \$4000, as well as by Spanish sources. There will be 36 participants from Spain, Portugal, Canary Islands and five Latin-American countries.

The 11th school is being prepared for 17 September to 10 October 1980 at Island Hvar, S. R. Croatia, Yugoslavia, with the topic of the physics of the solar system and the stars, for students of Mediterranean and Balkan countries. Funding includes contributions from IAU funds, from UNESCO and from the Scientific Council, S. R. Croatia.

Requests for future schools should go to D. Wentzel and J. Kleczek. Iraq, East Africa, French-speaking Africa, and Venezuela have been mentioned as possibilities.

Amendment of rules for ISYA: The rules for Commission 46 as approved at Grenoble were amended by the addition of a paragraph to rule 1. This rule now reads:

1.) The President, Vice-President(s), Secretary of ISYA and Past President will constitute a sub-committee of Commission 46 to regulate the organisation of the ISYA. The Secretary of the ISYA will be the Secretary of the sub-committee and will keep the sub-committee informed of all proposed ISYA, the details of their organisation and evaluation. The President of the Commission will inform the General Secretary of the Union of the programme for each proposed school only when approved by the sub-committee.

The sub-committee approves the preliminary programme, then the President of the Commission informs the General Secretary. The final version of the programme must take into account the Executive Committee recommendations together with those given by sub-committee members.

VII. ASTRONOMY EDUCATION MATERIALS

Only the Slavic-language portion was available at the meeting. It was prepared by E. Kononovich. Dr. B. Peery is currently writing the English-language material, based on a print-out of all English-language materials by the computer services of the U.S. Library of Congress (but which is too extensive and needs to be evaluated for our purposes). A telegram from Dr. L. Mavridis indicates the material in other languages is ready for distribution.

The collation of material suitable for AEM continues to be the most difficult aspect. Kononovich and Peery agreed to continue collating their parts. Prof. Houziaux is to investigate possible help through his government. If possible, all three parts of AEM are to be published together, in a single format, with a view to commercial publication of subsequent issues. They should no longer be called Addendum, since the original volume is out of print and largely outdated. Thus some permanent sources, for instance of visual aids, should be repeated in each edition.

D. Schatz mentioned that a good beginning list of astronomy education materials is included in the workbook "Effective Astronomy Teaching and Student Reasoning Ability" available from the Astronomical Society of the Pacific (address below), \$3 for IAU members.

A. Fraknoi summarized the activities of the Astronomical Society of the Pacific (1290 24th Ave., San Francisco, CA 94122, USA). These include i) "Mercury" magazine, which has a regular feature on astronomy education, ii) an internationally syndicated weekly newspaper column on astronomy (500 words) available for newspapers everywhere, iii) a series of resource materials for teachers including bibliographies, iv) a mail order catalogue of educational materials.

The association of French teachers in Physics publishes "Les Cahiers Clairaut", which provide exercises, review papers, etc. in astronomy for science school teachers.

VIII. PROJECT CONTRATYPE

M. Gerbaldi reported on her pilot scheme, in the period 1975-76, of distributing slides from a collection of 56 slides, at cost, from the Institut d'Astrophysique, Paris. The greatest success in reaching the developing countries was obtained from an announcement in the Courier de l'UNESCO, June 1976, which yielded 37 letters from developing countries, mostly from South America (plus 25 from developed countries other than France). She suggests two problems must be overcome: i) While there are commercial slides available, teachers from developing countries do not have the foreign exchange. There exist "UNESCO coupons". ii) The range of slides is huge and of variable quality, so

that a critical analysis is needed, which could appear in our newsletter and be announced in the UNESCO bulletin. M. Gerbaldi agrees to start the analysis.

M. Gerbaldi and L. Gouguenheim have assembled two sets of 24 slides each, on the subjects of gravitation and of spectral analysis. Each set comes with a booklet of 40 pages. The booklet gives not only a description of the slides but an analysis from a physical point of view, which they consider their most important contribution. The booklet is in French. Can UNESCO provide translations so that wider distribution is possible? Source of the slides:

Centre National de Documentation Pédagogique
Service de Vente des Publications de l'Éducation Nationale
13 rue du Four
75006 PARIS - FRANCE

Serie: Diatheque Sciences Physiques
Astrophysique I: la loi de la Gravitation dans l'Univers.
Astrophysique II: Connaissance des Astres par leur rayonnement.

Kononovich in the discussion paper on Project Contratype emphasized the need of a complete treatment of slides from both an educational point of view and practical usage in the classroom, possibly through special publications in one of the well known astronomy magazines.

IX. VISITING PROFESSORS PROJECT

Dr. Rigutti commented that little interest exists for the project in its present form of merely listing opportunities for visits.

A sub-committee of Kononovich, McNally, Wentzel and Okoye formulated the following recommendation to the IAU Executive Committee:

Commission 46 having regard to the need a) to introduce astronomy throughout the world, b) to strengthen developing and existing teaching in astronomy, and c) to enhance awareness of the place of the Earth in the solar system and the wide universe, proposes that the IAU establish an Annual Visiting Lecture-ship.

The lecturer should be an astronomer of scientific distinction. He/She should also be particularly gifted and interested in public appreciation of astronomical topics. Cognisance should also be taken of fluency in the appropriate language of the country to be visited. The programme for a typical visit might involve 3 public lectures and 1 scientific seminar, during the course of 1 month duration in the country. Where possible, the visiting lecturer should be based at a local university or institute of higher learning. The lecture-ship should be used to promote knowledge and understanding of astronomy, particularly in the countries having little or no formal astronomy.

The cost to the IAU should be limited to a) transportation, b) subsistence, and c) a small honorarium to the lecturer. It would be hoped that the subsistence would usually be met through local hospitality.

The proposal should be seen as falling within the auspices of Commission 46 and the Visiting Astronomers Program of Commission 38. Both commissions are to be consulted over choices of lecturer and venue.

It was suggested that perhaps a portion of funds for Commission 38 could be used for this purpose.

The proposal is to be considered also by the working group on education of astronomers from developing countries (see below).

X. EDUCATION OF ASTRONOMERS FROM DEVELOPING COUNTRIES

Dr. Sandqvist (Sweden) asked the commission to support the resolution to the IAU General Assembly by the Swedish National Committee, which is to encourage fellowships for astronomy students from developing countries. Dr. Rigutti (Italy) urged that this be supported by funds from IAU and possibly from UNESCO. S. Ferraz-Mello (Brazil) pointed out that the mere training of students without a supporting home institution might not succeed in fostering astronomy in a developing country. After some discussion, President Kononovich summarized that it was the sense of the meeting that the Commission approves in principle.

A working group on the education of astronomers from developing countries was formed (see below).

XI. FUTURE MEETINGS OF THE COMMISSION

Incoming President Wentzel thanked Dr. Kononovich for all his hard work as President and noted in particular the very informative collection of National Reports. Several countries now hold meetings and workshops to help teachers to include more and better astronomy in their classes. The topic of teaching astronomy to teachers may be a good one for a session at the next General Assembly.

Session of Working Group on Education of Astronomers from Developing Countries, 22 August 1979

The working group is to consist of S. Ferraz-Mello (Brazil) as chairman, B. Hidajat (Indonesia), J. Kleczek (Czechoslovakia), S. Okoye (Nigeria), Aa. Sandqvist (Sweden), and two members from Commission 38, J. Delhaye (France) and M. Kaftan (Iraq).

The working group is to discuss the training of astronomers in countries with little or no formal astronomy and by August 1980 produce a draft, with justification, of the one or two most practicable proposals that the IAU might support. The deliberations should include the Swedish proposal referred to Commission 46 by the IAU Executive Committee. The President of Commission 46 will seek comments upon the draft, so that the working group can present a revised proposal by December 1981.

Address for comments on these topics: Dr. S. Ferraz-Mello, Universidade de Sao Paulo Departamento de Astronomia, Caixa Postal, 30627, 01000 Sao Paulo S.P., Brazil.

Discussion among group members (with B. Wood, D.A. MacRae and D. Wentzel also present) stressed the great variety of needs that might apply to various countries. It was decided first to enquire among sympathetic individuals in a small number of countries as to their local possibilities for introducing astronomy in their countries.

Session III, 22 August 1979 Teaching Astronomy at the University Level

An all day meeting was held to discuss the teaching of astronomy at the university level. Attendance was approximately 100-125, with good representation from a broad range of countries.

Four invited speakers participated. First, G. Abell (U.S.A.) presented "An Overview of Astronomy Education" with an emphasis on the goals of teaching graduate students, e.g. preparing some graduate students expressly for teaching in small, non-PhD granting institutions. He also stressed the opportunities for astronomers to reach large numbers of non-science students, through radio/TV programs as well as university and community college courses. The next invited speaker was H. Eichhorn (U.S.A.) who spoke on "Teaching Astrometric Concepts." He emphasized teaching astronomy by tying it in with astrophysics.

The third invited speaker was J. Chamberlain (U.S.A.), who spoke on "The Use of the Planetarium in Teaching University-Level Astronomy." He discussed non-credit astronomy courses taught by planetariums, and instruction versus entertainment in planetarium shows. The final invited speaker was D. Clark (Scotland), who spoke on "Teaching Observational Studies;" he illustrated his presentation with examples from his highly successful teaching program at Glasgow.

Fifteen contributed papers were presented by teachers from eight different countries. Among these, Sandqvist (Sweden) demonstrated his innovative umbrella/star chart, and he described an impressive program in teaching astronomy to the public in Sweden. Pierce (U.S.A.) described how teaching astronomy is a community college (virtually unknown in most other countries) differed from the more usual university course. Two representatives from the University of London (Doretsky and McNally) described a student spectrograph, and mathematics in teaching astronomy. Iwaniszewska (Poland) reported that astronomy is a required course in secondary schools in Poland, and Kononovich (U.S.S.R.) described secondary school astronomy in the U.S.S.R.

13 August 1979
Session With Canadian School Teachers

About 35 teachers attended, 50% from Ontario, 30% from Quebec; others from as far as Saskatchewan and British Columbia.

Opening remarks by Dr. Kononovich included an outline of the role of astronomy in the school curriculum of the USSR and a summary of "Tendency of Astronomical Education", results of an international survey (available with the National Reports, see item I.) Dr. J.R. Percy (University of Toronto) discussed the place of astronomy in high school curricula and the role of astronomy in the Canadian high school education. As a comparison, Miss L. Couguenheim (Observatoire de Paris) presented a paper on teaching of astronomy in French schools. Dr. R.L. Bishop (Acadia University, Canada) introduced the role of the Royal Astronomical Society of Canada in teaching of astronomy.

Practical aspects were presented by Dr. R. Robbins (University of Texas, USA) on audiovisual materials, Dr. W. Osborn (Central Michigan University, USA) on observational activities for school teachers, with emphasis on observations with simple, inexpensive equipment, and Dr. J. Holzinger (Franklin and Marshall College, USA) on laboratory experiments in astronomy. Parallel sessions concerned telescopes for teaching in schools with specific examples (in English) and astronomy in the Quebec curriculum (in French). D. Levy (Canada) reported on teaching young children in summer camps, using color slides and taped commentary.

The meeting concluded with discussions based on the Piaget Workshop with applications in teaching of astronomy, as organized by D. Schatz (Pacific Science Center, USA).