

COMMISSION No. 5

DOCUMENTATION AND ASTRONOMICAL DATA

(DOCUMENTATION ET DONNEES ASTRONOMIQUES)

Report of Meetings: 4, 5, and 10 August 1988

PRESIDENT: G. A. Wilkins

Session 1.

4 August 1988

09.00-10.30

BUSINESS MEETING (1)

Chairman: G. A. Wilkins

Secretary: G. Lyngå

1. Introduction. The President opened the meeting by paying tribute to the memory of Prof. Dr. Walter Fricke and Prof. Dr. Albert G. Velghe, who had been active members of the Commission for many years. He drew attention to the extensive programme of Commission meetings and to the need for secretaries to assist in the preparation of the reports; some items of business would be finalised on 10 August after the technical meetings. About 20 members of the Commission were present.

2. Report for 1985-88. The President reviewed briefly the activities of the Commission since the meeting in Delhi. He had prepared three Newsletters giving announcements and reports, but he had been disappointed at the small number of contributions received from members. Preprints of the formal report for 1985-87 (Trans. IAU 20A, 7-12) had been distributed with the Newsletter to all members and to about 50 other persons who were known to be interested in the activities. Astronomical data continued to be the major concern of the Commission, but there had also been a considerable revival of activity in the fields of documentation. There had been a meeting of the editors of the principal astronomical journals, but it had not been possible to reach full agreement on some of the major items in the new IAU Style Manual, which is to be published in Trans. IAU 20B. The Union continued to be represented on CODATA by G. Westerhout, but had terminated its membership of ICSTI since, at present, very few of its activities are of direct relevance to astronomy.

IAU Colloquium 110 on Library and Information Services in Astronomy had been very successful. It had just been held in Washington, D.C., on 27-30 July and at the Goddard Space Flight Center on 1 August. The attendance, by 125 persons from 26 countries, had been much larger than originally expected; the Local Organising Committee had obtained financial support, from both organisations and individuals, for many persons who would otherwise not have been able to attend. The Joint Discussion on New Developments in Documentation and Data Services for Astronomers had been held the previous day (3 August). It had provided a very useful forum for the transfer of information and ideas between astronomers and others who provide library and other services. These two meetings had served to stimulate a greater awareness of, and interest in, the activities of the Commission.

3. Officers. It was noted that, in accordance with past practice, the President (G. A. Wilkins) and Vice-President (B. Hauck) had been nominated to serve for a second triennium. [These nominations were accepted by the IAU Executive Committee.] Final consideration of the nominations for members of the Scientific Organising Committee and for chairmen of the Working Groups of the Commission was deferred to the second business meeting on 10 August.

4. Membership. The response to questionnaires, which had been distributed with Newsletter No. 3 and at the Colloquium and Joint Discussion, had shown that many persons wished to become members or consultants of the Commission. It was agreed to consider nominations at the second business meeting after the President had consulted the General Secretary about the policy on the admission of additional members and consultants. The President stated that G. R. Riegler had offered to

liaise between Commissions 5 and 44 (Astronomy from Space). It was agreed that it would be useful to establish a list of persons who would each liaise with one other Commission with which they were actively associated.

5. Activities. There was a general discussion about the current programme of activities of the Commission. It was agreed that the Working Groups (WGs) on Astronomical Data and Designations should continue; the former includes a task group on FITS (see below). The WG on Classification, under the chairmanship of P. Lantos, had produced a vocabulary of astronomical terms, which would be discussed during session 5; Lantos had suggested that a new WG on Information Retrieval be set up. It was agreed that this WG should cover the revision of UDC 52 and the compilation of a thesaurus of astronomical terms.

The President drew attention to the increased interest in editorial matters that had been stimulated by the preparation of the new IAU Style Manual, and it was agreed that the WG on Editorial Policy should be revived.

The discussions at IAU Colloquium 110 had demonstrated the need to extend the cooperation that already existed between astronomical librarians; the Physics, Astronomy and Mathematics Division (PAM) of the Special Libraries Association (SLA) acted as a useful forum and it was agreed to follow up the suggestion of setting up a joint WG on Astronomical Libraries between PAM and Commission 5.

C. R. Benn drew attention to the need for a working group that would encourage and facilitate the exchange of computer software through the use of the new computer networks. Concern was expressed that some other Commissions already had such WGs, but eventually it was agreed that it would be appropriate for Commission 5 to take on this activity, especially in respect of software of general application.

6. Working Groups. A provisional list of Working Groups and Task Groups, and of their chairmen, for 1988-91 was drawn up. P. Grosbol requested that the Task Group on FITS (Flexible Image Transport System) should be a separate permanent Working Group (and not part of the WG on astronomical Data) so that its importance would be more apparent to national agencies which should be encouraged to adopt the standards prepared by the Group; he described the recent work on the extension of the standards to cover catalogues and other tabular data. The decision on the list was deferred until the second business meeting to allow for further discussions during the technical sessions.

7. Resolutions.

P. Grosbol introduced two resolutions on FITS: the first concerned the extension of the standards and the second the setting up of a permanent working group., After discussion it was agreed that the President should forward these resolutions to the Resolutions Committee of the Union. [They were adopted by the General Assembly and are given as resolutions B1 and B2.]

The President draw attention to the draft text of a resolution on the preparation of astronomical papers to be proposed by the Executive Committee of the Union concerning the form of references and the use of SI units. He explained that he had been invited to speak to the Executive Committee at its meeting on 31 July about the IAU Style Manual and he had identified a few points of particular concern. After discussion it was agreed that he should suggest to the Resolutions Committee that the resolution be extended to refer explicitly to the Style Manual and to the designation of objects. [The matter was discussed again at session 6 on editorial policy and by the Executive Committee on 9 August. The revised resolution was adopted by the General Assembly, and is given as resolution A3 on the Improvement of Publications.]

8. Representatives. It was agreed that G. Westerhout should be nominated to the Executive Committee as the IAU representative on CODATA.

The business meeting was adjourned until 10 August.

Session 2.

4 August 1988

11.00-12.30

TECHNICAL AIDS FOR DATA Chairman: G. Westerhout Secretary: P. J. Hanisch

The meeting of the Working Group on Astronomical Data was opened by the Chairman, who pointed out that, in spite of three WG newsletters, there had not been much activity, other than by the FITS Committee. He requested that WG members communicate regularly with the Chairman.

1. Networks. D. Wells reviewed the NSFNET, the U.S. National Research Network. It connects the supercomputer centres and MSF regional networks, using TCP/IP protocol. Backbone network speeds will be upgraded in steps from 56 to 1544 Kb/s. IBM routers are expected to reach 45 Mb/s by 1991, contingent on cost. SPAN and MSFNET are full-function, remote login networks, not just mail and file transfer. Through the various networks, virtual-image displays (IRAF, AIPS, IDI/Trieste), database servers, and archive servers are accommodated, as well as remote observing.

2. STARLINK. R. J. Dickens reported on the UK national interactive data-analysis facility STARLINK, started in 1979 and based on a network of VAX 780 computers. There are now 11 major nodes, 7 minor nodes, 12 remote nodes, and 1000 users. All nodes are linked through JANET. About 500K lines of code, contributed from all STARLINK nodes, are available to users.

3. ASTRONET. M. Pucillo discussed the Italian ASTRONET, connecting 70 CPUs. The primary effort is the standardization of software, based on MIDAS, including portable graphics software. The speed of the network connections (TCP/IP and DECNET) is being improved and a "distributed computing system" over a LAN is being implemented.

4. SPAN. M. VanSteenberg reported on the NASA network SPAN, which now has 2000 registered nodes and is managed by the National Space Science Data Center. Primary routers are located at NASA centers GSFC, MSFC, JSC and JPL. The backbone speed is 56 Kb/s, and there are connections to Europe (ESOC at Darmstadt) and Chile (SN). SPAN has supported several NASA missions, and it supports use of the IUE archive at GSFC (400 images per month requested) and IUE remote observing.

5. New storage technologies. M. Rushton presented an overview of the WORM (write once read many) optical disks, CD-ROM (5¼-inch optical disk) and helical-scan high-volume cassette tape technologies. Key issues are the existence of media standards (international organizations or de facto standards), cost, and lifetime. WORM optical disks (12-inch and 5¼-inch) have a top capacity of 2-3 GB (12-inch double sided), error rates (uncorrected) of 1 in 1 Tb, data transfer rates of 100-200 Kb/s, and lifetimes of 30 years. Unfortunately, the media are not interchangeable. A 12-inch drive costs about \$13000, host computer adapter \$2000, software device driver up to \$6000, 12-inch disk \$350. The next generation is due in under 2 years, and considerable capacity and transfer rate increases are expected. The CD-ROM technology is standardized. CD-ROM disks store up to 650 Mb. A master is produced first from tape, disk, network, etc. (\$1500-300 per disk), after which copies are made (\$2-10 per disk). A drive costs \$500-1000. The helical-scan recording technique, using 8-mm videocassette tapes, stores 2 GB on a \$10 cassette. A complete subsystem costs \$5000-7000. This very informative review ended with a short report on juke boxes, costing anywhere from \$15K to over \$100K.

6. FITS. P. Grosbol reported on the activities of the FITS task group and pointed out that details of the FITS Tables Extension, including blocking factors, printable arrays, etc. are given in Astron. Astrophys. Suppl. Ser. 73, 359-372, 1988. He presented two resolutions on FITS and the Working Group agreed that: (1) the use of the Tables Extension should be an IAU recommended practice; and (2) a new FITS WG should maintain and review FITS standards.

Session 3.

4 August 1988

14.00-15.30

DATA CATALOGUES

Chairman: G. Westerhout

Secretary: G. Westerhout

1. Data centre reports. P. Dubois reported that the Strasbourg Data Centre (CDS) now has 5000 catalogues, and the SIMBAD database contains data and bibliography on 600 000 stars and 100 000 nonstellar objects. SIMBAD is heavily used in the planning of space projects. A colloquium on catalogue precision is foreseen for 1989. W. H. Warren reported that the NASA Astronomical Data Center (ADC) has processed 1830 requests, distributing 1097 catalogues in digital form since the New Delhi General Assembly. An ADC Online Information System has been developed to allow users to obtain information and submit requests via SPAN and Internet by logging into the National Space Science Data Center VAX 8650 Computer. Smaller data sets are now being disseminated electronically via SPAN and BITNET. S. Nishimura reported that the Japanese data centre will be moved from the Kanazawa Institute of Technology to Tokyo, where it will be operated within the new National Observatory.
2. Database systems. S. Lubow highlighted the differences between commercial and special purpose database systems. He pointed out that relational systems have great flexibility, allowing a very large set of queries to be expressed, the use of nonprocedural query languages, and easily reorganizable and highly portable (tabular) data. There are two major uses in astronomy: ground-support systems and data catalogues. Both Europe and the U.S. have formed working groups to develop efficient remote-access, highly-portable data and software, and powerful user interfaces. An important question is whether to use commercial rather than special-purpose database/file systems. The commercial systems have a very powerful background, standard query language, run on general hardware, but are expensive (from \$2000 to over \$100 000). Special-purpose systems are expensive to develop but software is in the public domain. A major issue is that major commercial systems currently do not provide good capabilities for multi-dimensional searches in, for example, the HST guide-star catalogue. More powerful general purpose, commercial systems are, however, under active development.
3. STARCAT. F. Ochsenbein described the STARCAT (Space Telescope Archive and CATalog) online system, implemented on a VAX computer and an IDM 500 database machine, giving users access to a wide variety of astronomical catalogues and including query capabilities using OMNIBASE. Although the system was designed primarily for the archiving and retrieval of HST data, its interfaces to MIDAS (Munich Image Data Analysis System) and SIMBAD and to complete astronomical catalogues make it a valuable tool for data analysis. The system is available at ESO, the Canadian Space Astronomy Data Centre (Victoria), The Space Telescope Science Institute, and the U.S. National Space Science Data Center. Future developments include an enhanced and modified query system, graphics capability, an IRAS interface, and the implementation of additional astronomical catalogues.
4. Catalogue precision. G. Lyngå draw attention to the problems that are caused when catalogues do not include statements of the precision of the data, thus leading non-experts to assume precisions far beyond what the catalogue can provide; he proposed that a resolution urging the inclusion of estimates of precision in all catalogues. G. A. Wilkins pointed out that this subject is addressed in the CODATA guide for the presentation of data; journal editors are, however, reluctant to exercise detailed control. W. H. Warren commented that in principle the data centres could exercise control by refusing to accept catalogues without proper documentation. The problem must be solved and some action by the Working Group is needed in the next triennium.
5. Where are the data? W. H. Warren described the problems associated with locating particular astronomical catalogues and data when they are needed. The development of an astrophysics master directory (MD) is in progress in connection with NASA's Era of the Great Observatories. The MD will be an online system through which a user can discover or verify the existence of desired data and find out where the data are located. For catalogue data, the Astronomical Data Center at NASA has developed an online system that gives access to the large list

of catalogues available for distribution. Catalogues can be located by category (type of data), short titles, and keywords that have been assigned to each catalogue. Brief descriptions of the catalogues are currently being entered into the system.

6. Archiving of astronomical data. Carlos Jaschek sent a review on this subject which was summarized by Gart Westerhout in his absence. He pointed out that we have recently re-discovered the importance of archiving: modern methods can improve the interpretation of old observations, and many phenomena turn out to be variable in time. Transactions of a meeting in Montpellier, France, were published in CDS Bulletin No. 31 (1986), and they show that the importance of archiving observations has not yet become apparent to many colleagues. In CDS Bulletin No 35 (1988) an analysis will be published of a questionnaire sent to all observatories; 139 replies were received from 33 countries. A short summary follows: 73% report that an observing file exists, but only 47% of these (i.e. 35% of all archives) are computer readable. Only 45% of institutions have a well-defined archiving policy. This is surprising, because most of the other things concerning observations are ruled by well-defined policies. Only 67% of all observations are fully documented! And finally, 67% would like to see the publication of a set of guidelines. Jaschek concluded that guidelines should be drawn up by a small committee, mostly in the form of broad recommendations (such as "start from now rather than from 1910" and "make observing files computer readable") which should be widely distributed and might, hopefully, lead to an IAU resolution at the next General Assembly.

Session 4.

5 August 1988

09.00-10.30

DESIGNATIONS

Chairman: F. Spite

Secretary: K. S. de Boer

1. Introduction. C. Jaschek, the Chairman of the Working Group on Designations, was unable to travel to Baltimore, but his introductory remarks were read by the Chairman of the session, F. Spite. He drew attention to the importance of preparing clear recommendations to authors for publication in the IAU Style Manual and in journals.

2. Membership. It was agreed that the members of the WG for 1988-91 should be:

K. S. de Boer, H. Bond, H. Dickel, O. B. Dluhnevskaya, P. Dubois, P. Hodge, M.C. Lortet, J. M. Read, F. Ochsenbein, F. Spite (Chairman) and J. Young.

3. General problems. P. Dubois spoke about the problem of choosing appropriate designations for use in the SIMBAD database, which allows retrieval of bibliographic and other information for specific objects. Many examples of inadequate notations have been found, and it was sometimes not possible to use the notations given in the First Directory of Nomenclature. C. R. Benn drew attention to the fact that 10% of the objects observed with the Isaac Newton Telescope in 1984-87 could not be identified from the designations entered in the log by the observer, thus making impossible the retrieval of the data from the archive. M.-C. Lortet spoke about erroneous and careless practices in the literature, and she reiterated the need for precision in observing logs, especially for stars in small groups.

4. Galaxies. K. S. de Boer reported that Commission 28 had revived its WG on Nomenclature. New systems are needed for designating faint galaxies and objects within galaxies.

5. Planetary nebulae. H. Dickel reported on proposals by a WG of Commission 34 for a new system for the designation of planetary nebulae. This led to a general discussion on the use of special symbols to show that the type of a new object is not yet certain or that the type indicated by an existing designation is doubtful or definitely wrong. The general view was that such symbols should not be part of the designation.

6. Memorandum on designations. The Chairman introduced a revised memorandum on designations that had been prepared for discussion with the intention that editors of journals would be asked to publish it regularly. Amongst others, H. Abt (editor of the Astrophysical Journal) commented that he found the document long and confusing, and he would expect authors and copyeditors to ignore it. It was eventually agreed that a small group should be formed to redraft the memorandum. [The new version was circulated for comment by de Boer and the substance is to be given in the new Style Manual.]

7. Other points. It was agreed that the 'clearing house' for enquiries about designations should be continued even though only a few enquiries had been received. The chairman emphasised the need for the use of typefaces that would clearly differentiate between the numeral zero and the letter O and between the numeral one and the lower-case letter L. The managers of databases should refuse to include catalogues and lists that do not conform with the basic recommendations on designations. H. Dickel had provided many short contributions about designations for IAU Today (the daily newspaper of the General Assembly); the use of SIMBAD had been demonstrated in the exhibition area; these actions have drawn attention to both the problems and the possible solutions.

Session 5

5 August 1988

11.00-12.30

CLASSIFICATION

Chairman: B. Hauck Secretary, W. H. Warren, Jr

1. Introduction. The Chairman, P. Lantos, of the Working Group on Classification and Information Retrieval, was unable to attend the Assembly and so G. A. Wilkins introduced the three main topics of the agenda. There was then a general discussion about the problems of the use of keywords and classification codes.

2. Revision of UDC 52. Wilkins drew attention to the desirability of making another revision of the astronomical schedule (52) in the Universal Decimal Classification (UDC) in order to take account of the major developments in astronomy since the last major revision in 1975. The UDC schedules are widely used throughout the world (although not in North America where the Library of Congress scheme is dominant) in libraries and for information retrieval; it can be used to provide a very precise, language-independent description of the subject matter of a paper or book. At present he is the link between the WG and the International Federation for Information and Documentation (FID), which has the overall responsibility for UDC. He asked for volunteers by astronomers who would be prepared to examine and amend the schedule for their areas of expertise.

3. Vocabulary. J.-C. Pecker introduced, on behalf of Lantos, the latest version of the 'IAU Vocabulary' of keywords, which had been distributed before and during the meeting. The list contains about 1600 terms and is divided into seven chapters that cover broad areas. He suggested that the list be included in the IAU Style Manual so that it would readily be available for the indexing of astronomical papers. H. Abt considered that authors should be asked to suggest subject-headings that would be appropriate for use in the index of the journal concerned. After a lengthy discussion, it was agreed that the list should be published, but it first needed further detailed study and revision by the WG. Hauck suggested that it could be published in, for example, the information bulletin of the Strasbourg Data Centre.

4. Thesaurus. R. M. Shobbrook reviewed briefly the project to develop an IAU Thesaurus, which she had discussed in greater detail during Joint Discussion 1. The Thesaurus would supersede the Vocabulary since it would give more guidance to the indexer about the use of preferred terms and to the searcher about other related terms. It would also indicate the corresponding classification codes in other systems. The preliminary listing of the Thesaurus had been largely developed by librarians and she now needed the assistance of astronomers in checking the listings for corrections and completeness in their areas of expertise. She also saw the need for financial support for the purchase of

appropriate software for developing the cross-references and maintaining the thesaurus. W. Lück offered to make available the facilities of the Fachinformationszentrum (FIZ) at Karlsruhe for this purpose.

Session 6.

5 August 1988

14.00-15.30

EDITORIAL POLICY

Chairman: G. A. Wilkins

Secretary: B. Corbin

1. Introduction. In introducing the session the Chairman pointed out that the Commission did not have a working group on editorial policy, but he recommended that a small group be formed under the chairmanship of P. A. Wayman, a former General Secretary of the Union. Its major task during the coming triennium would be to review the new IAU Style Manual, but it should also consider other aspects of IAU publications.

2. Style Manual. Wilkins reviewed the stages in the development of the third draft of the IAU Style Manual, which would replace the 1971 edition of the IAU Style Book. It had unfortunately not been possible to arrange a meeting with the editors of the principal journals until May 1988; he had been disappointed to find that the editors did not consider it desirable that astronomers should conform to internationally agreed recommendations in respect of such matters as the use of SI units and the abbreviations of the titles of journals in lists of references. He was pleased, however, that the IAU Executive Committee had decided to propose a positive resolution on these points. (See paragraph 7 of the report on Session 1.) It is intended to publish the Manual in volume 20B of the Transactions of the IAU, even though it has not been possible to obtain agreement on some points.

H. Abt, the editor of the Astrophysical Journal (Ap.J.), commented that there had been a wide measure of agreement on other points at the meeting of editors. He considered that editors could not force astronomers to use SI units and he claimed that the use of the standard abbreviations for the titles of the principal astronomical journals, instead of the very short abbreviations now used in Ap.J., would lead to significant increases in the cost and price of the journal. A lively discussion ensued on these and other topics. It appeared to be generally felt that if the very short abbreviations are to be used, they should be restricted to the very commonly cited journals and their meanings should be published in the journal for the benefit of persons who are not familiar with them.

It was agreed that the Style Manual and other such reference documents should be published as separate reprints. A brief summary of the principal recommendations of the Style Manual should also be made widely available.

3. Code of Practice. Wilkins drew attention to the statement on 'Guidelines for Publication' which had been posted on the notice-board of the Commission. This had been prepared by the American Geophysical Union, but appeared to be equally applicable to astronomers as to geophysicists. There was general agreement to the proposal that this statement be included in the Style Manual, and some considered that such a statement should be adopted by the IAU.

Session 7.

5 August 1988

16.00-17.30

ELECTRONIC MAIL

Chairman: B. Hauck

Secretary: A. Fiala

The Chairman explained that the meeting had been called to allow an opportunity for the further exchange of information and ideas about the use of computer networks for the transmission of messages (as in electronic mail) and the publication of information (as in electronic bulletin boards). These topics had been presented and discussed during session 3 of Joint Discussion 1 on 3 August. C. R. Benn gave a brief review and there was then a general discussion amongst the small number present. It was agreed that it would be useful for Commission 5

to act as forum for further consideration of the ways in which such techniques could be better used by astronomers; for example, to encourage the use of a simple system for usernames for electronic mail.

Session 8

10 August 1988

11.00-12.30

BUSINESS MEETING (2) Chairman: G. A. Wilkins Secretary: C. R. Benn

9. Review of activities. The President reviewed briefly the actions being taken as a result of the discussions during the technical sessions. He drew attention to the revised text that he had suggested for the resolution by the Executive Committee on the improvement of publications; none of those present raised any objection to the revised wording. The joint meeting with Commission 46 on the problems of developing countries had been well attended and he hoped it would prove to have been very productive (see the following report).

10. Working Groups. The following list of Working Groups and Chairmen for 1988-91 was endorsed.

W.G.	Astronomical data	G. Westerhout
W.G.	Information retrieval	L. D. Schmadel
T.G.	UDC 52	G. A. Wilkins
T.G.	Thesaurus	R. M. Shobbrook
W.G.	Designations	F. Spite
W.G.	Editorial policy	P. A. Wayman
W.G.	FITS Standards	P. Grosbol
W.G.	Computer software	C. R. Benn
J.W.G.	Astronomical libraries	W. H. Warren, Jr

The Task Groups on UDC 52 and the Thesaurus are to be regarded as activities of the Working Group on Information Retrieval. The WG on Astronomical libraries is to be set up jointly with the Special Libraries Association. The membership and terms of reference of each Group are to be determined by the Chairman in consultation with the President of the Commission.

11. Organising Committee. It was agreed that the following persons would be members of the Organising Committee for 1988-91:

O. B. Dluzhnevskaya, C. O. R. Jaschek, J. M. Mead, L. D. Schmadel, F. Spite, W. H. Warren, Jr, P. A. Wayman and G. Westerhout.

12. Membership. It was agreed that all the 25 members of the Union, including 7 new members, who had indicated their wish to join the Commission, should be accepted. The President stated that the General Secretary had indicated that it would be appropriate for the Commission to have not more than about 10 persons as consultants, and so it was necessary to make a rather arbitrary selection from amongst those who were likely to contribute to the work of the Commission during the coming triennium. It was agreed that the President should write to the Presidents of other Commissions to enquire if they wished to nominate anyone to liaise with Commission 5 on matters of common concern.

13. Other business. There being no other business the President closed the session by expressing his thanks to all who contributed to the work of the Commission during the past triennium, and especially to those who had contributed to Colloquium 110 and to the meetings during the General Assembly.

COMMISSION 5: DOCUMENTATION AND ASTRONOMICAL DATA

COMMISSION 46: THE TEACHING OF ASTRONOMY

Report of Joint Commission Meeting on 9 August 1988

1400-1700

PROBLEMS OF DEVELOPING COUNTRIES

Chairman: G. A. Wilkins

Secretary: C. Iwaniszewska

1. Introduction. The President of Commission 5 stated that the aim of the meeting was to review the problems of developing countries in respect of documentation, data retrieval and teaching and to consider what action should be taken to alleviate these problems. Three papers were presented and there was an extended discussion that related mainly to the acquisition of publications for teaching and research. It soon became clear that the discussions at the preceding IAU Colloquia No. 105 on the Teaching of Astronomy and No. 110 on Library and Information Services in Astronomy had drawn attention to similar problems and had led to similar proposals, which are outlined below. The meeting was attended by at least 55 persons from 32 countries. A. H. Batten, the Chairman of the new IAU Working Group on the Promotion of Astronomy, sent apologies for his absence as he was required to attend a meeting of the IAU Executive Committee; he considered that the new Group must operate in close collaboration with Commissions 5, 46 and 38 (Exchange of Astronomers).

2. Educational material for astronomy in developing countries. J. R. Percy (Canada) summarised the discussions at Colloquium 105 under six headings:

(a) Acquiring current material from abroad. Current monographs and journals are essential for graduate teaching and research and for the professional development of the instructors. The major problems are due to the shortage of funds and currency restrictions. Commission 46 produces a triennial listing of educational material in all major languages to help institutions to select the most appropriate material. Donations by authors, publishers and astronomical institutions should be encouraged, but appropriate arrangements are required.

(b) Acquiring less-current material from abroad. Several organisations are now engaged in collecting and distributing surplus books and journals, but better coordination is required to avoid waste of effort.

(c) Producing translations of important material. Translations are useful but they require good translators (who are poorly rewarded), as well as the cooperation of authors and publishers. School curriculums differ from country to country and it could be helpful to develop a standard curriculum and appropriate resource material.

(d) Reprinting material locally. Low-cost editions of books and journals could be produced locally and the IAU could help in obtaining the cooperation of authors and publishers.

(e) Reprinting with local modifications. The new desk-top publishing methods could allow 'reprints' to reflect the local cultural and scientific environment.

(f) Local authorship and publication. The ultimate aim might be to produce all educational material locally, but potential authors are few and usually overloaded, while the publishers are reluctant to produce books for a limited market. The IAU might be able to help authors to find free photographs and diagrams and to underwrite some publications.

J.-C. Pecker (France) drew attention to the possibility of getting support from the educational as well as the scientific division of UNESCO.

3. Resource sharing between libraries. A. Ratnakar (India) drew attention to the importance of information about the availability of publications and to some of the suggestions put forward at Colloquium 110. (a) Preprints are now very valuable, but are not sent to all observatories; there should be an international centre for preprints. (b) Union lists of journals are available for some western countries; it would be useful to have an international list to help librarians to locate nearby copies of journals. (c) There should be a centre that collects and distributes disposal lists of surplus books and journals; this might be the Third

World Academy in Trieste. (d) In each country there should be one person or library that acts as a contact point for information about its resources. (e) Arrangements should be made to allow astronomers in countries without computer networks to obtain information by telex or post from the principal databases. (f) More journals should give information about papers that will be published.

Some of the comments on these points were as follows. (a) The Space Telescope Science Institute has offered to extend the distribution of the list of preprints that it receives; astronomers should be encouraged to send a copy of each preprint to STScI. Others wondered whether the costs of compilation and distribution could be justified. (c) Publications written in the same language group as that of the developing country are particularly valuable. (d) Consideration should be given to the possibility of using compact discs (CD-ROM) for personal computers to make databases more readily available. (e) "Current Contents" was considered to be more useful than preprint lists, but some observatories cannot afford to buy it.

4. International Space Year. L. Gougenheim (France) drew attention to the proposals for the International Space Year (ISY), which is to be held in 1992, and especially to the activities in education and public information in countries which do not normally engage in space activities. She considered that the opportunity should be taken to produce for public education: carefully selected sets of slides; appropriate written materials, including sets for students; planetarium programmes; and an ISY guidebook. These materials should have a worldwide copyright-free distribution. Scholarships to the International Space University for students from the Third World are proposed. The IAU should endeavour to ensure that full support is given to these activities by the Space Agencies. (The IAU General Assembly adopted a resolution recommending that IAU organisations and individual members should participate actively in ISY activities.)

5. Surveys. The Chairman drew attention to the questionnaire about astronomical libraries that had been distributed with Commission 5 Newsletter No. 3, and asked for further responses. S. Torres-Piembert (Mexico) considered that it would be useful to have a separate survey for library and teaching resources in developing countries. A form was hurriedly prepared during the interval and responses from delegates from eight countries were received; they revealed the small number of astronomical institutions in each country and that some do not receive even the principal astronomical journals and some do not have adequate access to personal computers and telex.

6. Costs of publication and page charges. It was suggested that publishers should be encouraged to allow libraries in the developing countries to buy journals at the reduced rate for individuals; it was pointed out that in some cases individuals could not obtain copies because there was no library subscription. Some agents (in India) refuse to allow discounts to IAU members. Attention was drawn to the problems posed by page charges and it was stressed that any request to waive charges should be made at the time of submission. A representative of UNESCO said that it is possible for individuals to buy (with local currency) coupons that can be used to purchase books or equipment in hard currency; applications must be made through the National Committee.

7. Links between institutes. There was general agreement that arrangements should be made to develop links at a personal level between institutes in developed and developing countries. An interchange of information about activities and resources could lead to the provision of assistance in a variety of forms, including information and advice as well as of publications and other materials. Such a system would help to avoid the situation where surplus publications are supplied but are then found to be unsuitable. It is important to ensure that free material is not subject to heavy postage and customs charges; they may often be avoided by sending the material via the embassy.

8. Teaching of astronomy. Finally, E. Kennedy (Canada) suggested that the history of astronomy, and especially its applications to surveying and timekeeping, is a very appropriate topic for education in developing countries, and M. L. Aguilar (Peru) stressed the value of the visiting lecturers programme.