

EXECUTIVE COMMITTEE

AUGUST 1961—SEPTEMBER 1964

PRESIDENT

Professor V. A. AMBARTSUMIAN, President of the Academy of Sciences of the Armenian S.S.R.,
Erevan, Armenia, U.S.S.R.

PRÉSIDENT

VICE-PRESIDENTS

Professor L. GOLDBERG, Harvard College Observatory, Cambridge 38, Massachusetts, U.S.A.
Professor Y. HAGIHARA, Department of Astronomy, Faculty of Science, University of Tokyo,
Bunkyo-ku, Tokyo, Japan.

VICE-PRÉSIDENTS

Professor G. HARO, Observatorio Astronómico Nacional, Apartado Postal 70-264, Ciudad
Universitaria, Mexico 20, D. F., Mexico.

Dr R. M. PETRIE, Dominion Astrophysicist, Dominion Astrophysical Observatory, Victoria,
B.C., Canada.

Dr B. STERNBERG, Director, Astronomical Institute, Czechoslovak Academy of Sciences,
Budečska 6, Prague 2-Vinohrady, Czechoslovakia.

Dr R. H. STOY, H. M. Astronomer, Royal Observatory, Observatory, Cape Province, South
Africa.

GENERAL SECRETARY

Mr D. H. SADLER, Royal Greenwich Observatory, Herstmonceux Castle, Hailsham, Sussex,
England.

SECRÉTAIRE GÉNÉRAL

The XIth General Assembly
also appointed as

La XIème Assemblée Générale
a désigné aussi comme

ASSISTANT GENERAL SECRETARY

Dr J.-C. PECKER, Observatoire de Paris, Section d'Astrophysique, Meudon (Seine-et-Oise),
France.

SECRÉTAIRE GÉNÉRAL ADJOINT

REPORT OF THE EXECUTIVE COMMITTEE 1961-1963

NARRATIVE REPORT

Introduction

This Report covers the period of three years from 1 January 1961 to 31 December 1963. It follows generally the pattern set by the previous Report for the years 1957-1960, as presented to the eleventh General Assembly and as printed in Volume XIB of the *Transactions*; however, much of the explanatory background information in that Report has not been repeated. Moreover, many of the decisions of the former Executive Committee either related to, or were reported at, the General Assembly of which a full account has already been published in Volume XIB of the *Transactions*. Further, most of the decisions and discussions by the Executive Committee have been published, often in some detail, in the *Information Bulletins*, which are circulated to Adhering Organizations, to Institutions on the Distribution List, as well as to all Members. For all these reasons the present Report is restricted primarily to formal matters and lists, which are necessary for permanent record; but special attention is drawn to the following section in which some of the more important problems facing the Union are discussed, and to the separate section on 'The Financial Situation'.

The Executive Committee has decided that the 'administrative' Commissions 5, 6 and 38 shall be regarded as Committees of the Executive Committee, but without change of name or status. Their reports follow after this Report, on page 75.

At its meeting in Liège, the Executive Committee appointed a Working Group on 'The System of Astronomical Constants' (see *Information Bulletin* no. 11, section 11); the report of the Working Group, which will be formally referred to relevant Commissions for consideration, is printed on page 593 (together with the Joint Discussion F on the Report of the Working Group on the IAU System of Astronomical Constants).

Current and Future Problems

As reported in *Information Bulletins* no. 7, section 14, and no. 8, section 2, a 'Committee on Future Organization' was appointed by the Executive Committee in August 1961. A full account of the decisions of the Executive Committee arising from the recommendations of that Committee has been published in *Information Bulletin* no. 9, section 5. In so far as these decisions require amendments to the Statutes and By-laws, they are being formally proposed for adoption by the twelfth General Assembly. However, the Executive Committee has considered many other aspects of the structure, organization and activities of the Union, and it may be appropriate briefly to mention some of these here.

Administration. The increasing size and activities of the Union, and particularly the increasing complexities of its association with other organizations, make essential an increase in the staff of, and the financial provision for, the administrative office. At present there are several directions in which the service to Members must be limited by lack of staff, while centralization of publication, with its associated sub-editorial work, is quite impossible. A proposal is being made in the Budgets for an approximate doubling of the present very modest provision for the administrative office.

Publications. The present arrangements for the publication of the proceedings of the symposia are not entirely satisfactory, especially in regard to the great variety of format, of methods of

publication, and of procedures for sales. The Executive Committee is considering how best it can standardize publication while still preserving its policy of wide distribution.

Symposia and Colloquia. It is hoped that the introduction of the colloquia (see *Information Bulletin* no. 9, section 2) will result in more informal small meetings being arranged by Commissions between the General Assemblies. The Executive Committee is generally faced with more proposals for symposia than it can adequately support financially, or organize effectively.

Activities of Commissions. The Commissions differ widely in scope, organization, number of members and in many other ways; and the Executive Committee is anxious to avoid giving precise directives as to how the scientific work of the Commissions is carried out. However, it is felt that, in a few Commissions, the activities have been less than the developments in the relevant subjects of research might have justified. The Executive Committee has no present intention of proposing any change in the organization of the Commissions, and wants the system of Vice-Presidents and Organizing Committees, introduced in 1961, to be given an extended trial.

Some re-arrangement of the subjects covered by the Commissions, and the possible combination of some Commissions, will be discussed during the General Assembly.

Teaching of Astronomy. A discussion on the teaching of astronomy is being organized during the General Assembly in Hamburg; among the administrative matters to be discussed will be whether the Union should set up a Commission (or a Committee) on the Teaching of Astronomy, and whether the Union should participate in the work of the Inter-Union Commission on Science Teaching.

Atmospheric Sciences Research. As reported in *Information Bulletin* no. 12, section 14, the Union is concerned, with other scientific Unions, in developing an expanded programme of atmospheric science research. The relevant Commissions should consider how they can contribute to such a programme, and how such an expansion will affect their functions.

Solar-Terrestrial Physics. As also reported in *Information Bulletin* no. 12, section 14, there is now an ICSU Working Group considering the regrouping of those disciplines which are particularly concerned with solar-terrestrial physics. It is becoming of some urgency to clarify the responsibilities of various Unions, Inter-Union Commissions and other organizations in this field, in order to avoid unnecessary duplication of administration, reports, scientific meetings and publications.

Project West Ford and Space Contamination. The Union's West Ford Committee continues its work, and has just issued a report on its study of the effects of the West Ford experiment on astronomical observations; this statement is reproduced in full on page 74. The Executive Committee, after sending copies of Berkeley Resolutions nos. 1 and 2 to the Heads of all Governments, on several occasions (for example, see *Information Bulletin* no. 9, section 2, Resolution no. 5) drew special attention to the dangers inherent in certain proposed experiments; the opinions of the IAU appear to be both heard and heeded.

The Union is anxious to co-operate with, and not unnecessarily to overlap, the COSPAR 'Consultative Group on Potentially Harmful Effects of Space Experiments', set up in response to the resolution of the International Council of Scientific Unions at its ninth General Assembly in London in September 1961; but this Group has not yet reported, and the Executive Committee will have to consider, in Hamburg, whether to re-organize and extend the functions of its existing Committee.

Special Projects

It is neither necessary nor desirable to list in detail every project entered into by the Executive Committee between General Assemblies. However, the following projects that appear under

item 12 (Projects authorized by the Executive Committee) of the 'Payments' accounts deserve some amplification; the reference letters are the same as in the accounts on page 67.

(a) *Centre de documentation pour l'observation des planètes*. At the meeting of Commission 16 in Berkeley, its Committee on 'Co-opération Internationale pour l'Observation des Planètes' recommended that two international 'centres de documentation' be set up, one in U.S.A. and the other in Europe. The 'centre de documentation' in U.S.A. is being organized by Dr G. P. Kuiper. Dr A. Dollfus, the President of Commission 16, agreed to set up the European centre in Paris, provided he could obtain adequate financial support. He was able to produce ample evidence of scientific support for the project, from institutions outside the U.S.A., and of the mass of material, including planetary photographs, requiring centralization. The Executive Committee agreed that this was a project for which the Finance Committee would have approved a grant if a proposal had been made in Berkeley; and a preliminary grant of \$750 was made in December 1961 in order that a start could be made. A supplementary grant of \$1250 was agreed at the meeting of the Executive Committee in Erevan in September 1962, after favourable reports had been received of the progress of the work; a full report on this project will undoubtedly be included in the Report of Commission 16.

(d) and (e) *New IAU System of Galactic Co-ordinates*. These projects arose from the decisions (in particular, Resolution no. 62) of the tenth General Assembly in Moscow in August 1958; Sub-Commission 33b was authorized to propose a new system of Galactic co-ordinates and to prepare tables for the conversion of equatorial to Galactic co-ordinates and vice versa. Sub-Commission 33b duly reported (see *Information Bulletin* no. 1, section 8) in 1959. Later, the actual papers on which the report was based were printed in *Monthly Notices of the Royal Astronomical Society*; the cost of reprints of these collected papers, which were given a wide distribution, were paid for under (e).

An agreement was reached with the Lund Observatory for the calculation and publication of the *Tables for the Conversion of Galactic Co-ordinates*, full particulars of which are given in *Information Bulletin* no. 6, section 5; under (d) the Union paid part of the cost of printing, in return for which copies were distributed to Institutions on the Distribution List.

Both these projects were authorized by the former Executive Committee prior to the eleventh General Assembly, but no payments were made until afterwards; they could not be specifically included in the budget for the years 1962-1964, and there was no supplementary budget for 1961.

(g) *International Polar Motion Service*. As briefly announced in *Information Bulletin* no. 9, section 15, the Union appointed Dr S. Yumi to serve as Acting Director of the Central Bureau of the International Polar Motion Service, after the death of the Director, Dr T. Hattori. It later became clear that a meeting with the President of Commission 19, at which future work could be discussed, was most desirable. The Executive Committee accordingly invited Dr B. Guinot to visit Mizusawa and to consult with Dr Yumi as to the conduct of the current work and future policy. As a result of this visit, the work of the I.P.M.S. is now on a sound basis, and is progressing well.

(h) *Southern Variable-Star Charts*. For many years Mr F. M. Bateson in New Zealand has been preparing and distributing a series of Southern Variable-Star Charts, which have been much appreciated and used by southern variable-star observers. The attention of the Executive Committee was recently drawn to the fact that Mr Bateson was himself paying the costs of reproduction of the charts and that, unless a grant was forthcoming, the series would have to be much reduced or terminated. On the advice of the President of Commission 27, the Executive Committee approved an immediate grant of \$500; the question of any future grants will be discussed by Commission 27 in Hamburg.

Meetings of the Executive Committee

The former Executive Committee held the twenty-first meeting during the eleventh General Assembly in Berkeley in August 1961, under the presidency of Prof. J. H. Oort; all members and both advisers were present.

The present Executive Committee has held three meetings under the presidency of Prof. V. A. Ambartsumian: the twenty-second meeting in Berkeley on 24 August 1961, when all members and advisers were present except Prof. G. Haro; the twenty-third meeting in Erevan, Armenia, on 30 August to 3 September 1962, when all members and advisers were present; and the twenty-fourth meeting in Liège, Belgium, on 28 June to 2 July 1963, when all were present except Prof. G. Haro and Prof. Y. Hagihara, who were prevented by illness from attending.

Twenty-three Circular Letters have been sent to members of the Executive Committee, which directs the affairs of the Union between meetings by correspondence.

Membership

Since the tenth General Assembly a change has been made in the adherence of Germany; the Federal Republic of Germany (Bundesrepublik Deutschland) and the Democratic Republic of Germany (Deutsche Demokratische Republik) now adhere separately. There are thus 42 countries at present adhering to the Union; a list of these countries, and of the Adhering Organizations, together with the approximate number of individual Members in each country, is given in Appendix I.

The following table gives the state of the individual membership:

| | |
|--|-------|
| Number of Members as at 1 January 1961 | 1082 |
| Elected at the eleventh General Assembly | + 238 |
| Co-opted (not nationals of adhering countries) | + 2 |
| Resigned | — 14 |
| Notified, since January 1961, as deceased | — 32 |
| | <hr/> |
| Number of Members as at 31 December 1963 | 1276 |
| | <hr/> |

A list of those Members whose deaths have been notified since January 1961 is given in Appendix II. Among so many distinguished astronomers it is possible only to pay separate tribute to the memory of those who have also contributed greatly to the administration of the Union:

to OTTO STRUVE, President in the years 1952 to 1955, and a former Vice-President, whose wide experience of astronomical administration and wise counsel were always at the disposal of the Union; a firm believer in the international aspects of astronomical co-operation, with one of the most famous names and ancestries in the history of astronomy, he was responsible for creating much of the mutual respect and trust that characterizes relations within our Union.

Commissions and their Membership

A full report of the discussions and decisions of the Executive Committee has been published in *Information Bulletin* no. 11. Most of the decisions consisted of requests to Commissions to consider, during their meetings in Hamburg, certain changes in their names, spheres of activity, or structure; as such they will be reconsidered by the Executive Committee, in the light of the views of the Commissions concerned, and submitted for approval by the General Assembly in Hamburg.

The Executive Committee will formally recommend to the General Assembly that a new Commission, no. 45, on 'Spectral Classifications and Multi-Band Colour Indices' be created, largely to take over the work of the former Sub-Commission 29c.

At the request of Prof. M. Schwarzschild, Dr P. Ledoux has been appointed Acting President of Commission 35 (Stellar Constitution). Consequent on the death of Prof. M. A. Ellison, Dr Z. Svestka has been appointed Vice-President of Commission 10 (Solar Activity).

In accord with the new rules regarding membership of Commissions, no formal record is kept of co-options to Commissions, so that no list of co-options is included here. Presidents of Commissions have been asked to base their proposals for future membership on the lists published in Volume XIB of the *Transactions*, which incorporate corrections (for accidental omissions and for subsequent co-options) to the lists as originally published in *Information Bulletin* no. 7.

Responsibility for the Committees and Working Groups of Commissions, even though these were formerly Sub-Commissions, now lies with the Commissions themselves; their constitution, terms of reference and membership are no longer the direct concern of the Executive Committee, and their reports are to be incorporated in the Draft Reports of the Presidents of their respective Commissions.

Statutes and By-laws

Three changes are being formally proposed by the Executive Committee to implement changes of policy that have been previously agreed by the Executive Committee and fully reported to Members in *Information Bulletin* no. 9, section 5. The fourth change (to By-law no. 10) arises as a consequence of the revised structure of the International Council of Scientific Unions, as adopted in Vienna in November 1963.

(a) *Statutes nos. 4 and 11(a)*. The purpose of the proposed changes is primarily to decrease the present relative disparity between the contributions from the smallest and the largest countries; at present there is a total range of 1 to 8, whereas the range in the number of Members is very much greater. At the same time it is hoped that the change will, through an increase in the total number of units of contribution, result in an increase in the income of the Union.

(b) *By-law no. 10*. The revised executive body of the International Council of Scientific Unions is now the Executive Committee, on which each Scientific Member Union has the privilege of nominating one representative. Membership of the ICSU Executive Committee is, however, co-ordinated with the two-yearly meetings of the ICSU General Assembly, and it is convenient for the Union to have the power of changing its representatives at times other than those of the General Assembly of the Union. For this reason the General Assembly is being asked to delegate its power of appointment to the Executive Committee.

(c) *By-laws nos. 12 and 13*. The proposed changes in these By-laws will permit an Assistant General Secretary to be added to the Executive Committee, in addition to the six Vice-Presidents. It is anticipated that the Assistant General Secretary will normally succeed the General Secretary after a period of three years, so that the normal procedure will be for an individual to serve for three years as Assistant General Secretary, followed by three years as General Secretary. But provision is made for variations from this normal procedure, should circumstances make it necessary.

The experience of having an 'unofficial' Assistant General Secretary (Dr J.-C. Pecker) since 1961 has amply demonstrated the necessity for formal provision for such an office; the scientific and administrative work of the Union has now outgrown the capabilities of a single individual.

(d) *By-law no. 24*. The increasing size and cost of the *Transactions* makes it essential to limit the amount distributed free to Members and others; there can be little justification in distributing the Reports of Commissions twice, once in the *Agenda and Draft Reports* and a second

time in the *Transactions*. The proposed change will give the Executive Committee discretion to restrict free distribution of the *Transactions* to that volume containing the proceedings of the General Assembly.

Organization of the General Assembly

In spite of the long discussion on this problem at the twenty-third meeting of the Executive Committee (as reported in *Information Bulletin* no. 9, section 5), no great changes are being made in the general pattern of the General Assembly. No symposia are being organized during the General Assembly, but no fewer than six Joint Discussions will be held, in addition to the meetings of Commissions. The planning of all these meetings, so as to avoid undue overlapping, requires the fullest co-operation from Presidents of Commissions in the early specification of their requirements for meetings.

The formal business at the sessions of the General Assembly itself will be reduced as far as practicable; a Resolutions Committee will again recommend to the General Assembly which of the resolutions proposed by Commissions should be submitted for detailed consideration by the Assembly.

Symposia and Colloquia

During the period under review the following symposia were held:

| no. | Subject | Place | Date |
|-----|--|---------------------------|----------------|
| 15 | Problems of Extra-Galactic Research | Santa Barbara | August 1961 |
| 16 | The Solar Corona | Cloudcroft | August 1961 |
| 17 | Visual Double Stars | Berkeley | August 1961 |
| 18 | Theoretical Interpretation of Upper Atmosphere Emissions | Paris | June 1962 |
| 19 | Site Testing | Rome | October 1962 |
| 20 | The Galaxy and the Magellanic Clouds | Canberra/Sydney | March 1963 |
| 21 | The System of Astronomical Constants | Paris | May 1963 |
| 22 | Stellar and Solar Magnetic Fields | Rottach-Egern (Munich) | September 1963 |

Nos. 15 and 17 were held shortly before, and no. 16 shortly after, the eleventh General Assembly. No. 18 was organized in co-operation with the International Union of Geodesy and Geophysics (IUGG), no. 20 in co-operation with the International Scientific Radio Union (URSI), and no. 21 in co-operation with the Scientific Committee on Space Research (COSPAR).

Two colloquia were held, both at the Royal Greenwich Observatory, Herstmonceux, in August 1962:

- Commission 36—The Transfer of Radiation in Stellar Atmospheres
- Commission 37—Star Clusters and Stellar Evolution.

Representation and Representatives

International Council of Scientific Unions. The President (V. A. Ambartsumian) and the General Secretary (D. H. Sadler) represented the Union at the following meetings of the International Council of Scientific Unions:

- the ninth General Assembly in London in September 1961
- the Extraordinary General Assembly in Vienna in November 1963
- the tenth General Assembly in Vienna in November 1963

the thirteenth meeting of the Executive Board in London in September 1961
 the fourteenth meeting of the Executive Board in Prague in October 1962
 the fifteenth (and last) meeting of the Executive Board in Vienna in November 1963

The Assistant General Secretary, Dr J.-C. Pecker, also attended the Extraordinary and tenth General Assemblies in Vienna.

The General Secretary is at present the Union's representative on the newly-formed Executive Committee of the ICSU; he attended the first meeting of the Executive Committee in Vienna in November 1963.

ICSU organisms. The Union participates in the work of a number of Special and Scientific Committees, Committees, or Inter-Union Commissions set up under the auspices of the ICSU, in co-operation with other international scientific unions. Where relevant to the Union, details of the constitution and membership of these committees have been given in the *Information Bulletins*. The following list is concerned only with the current representation from the Union.

- (a) Committee on Space Research (COSPAR), established by the ICSU:
by H. C. van de Hulst.
- (b) Special Committee for the International Years of the Quiet Sun (IQSY):
by G. Righini (as Vice-President) and by R. Michard (as Reporter for Solar Activity).
- (c) Comité International de Géophysique (CIG):
by G. Righini (as a member of the Bureau), and by R. Michard (as representing the scientific discipline of 'Solar Activity').
- (d) Federation of Astronomical and Geophysical Services (FAGS):
by B. Guinot and M. Waldmeier.
- (e) Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science (IUCAF):
by J. F. Denisse (Chairman), A. P. Moltshanov, J. H. Oort and A. Unsöld.
- (f) Inter-Union Commission on Solar and Terrestrial Relationships:
by C. W. Allen, J. F. Denisse, R. Giovanelli and E. R. Mustel.
- (g) Inter-Union Commission on the Ionosphere:
by C. W. Allen, R. N. Bracewell, V. G. Fesenkov and K. O. Kiepenheuer.
- (h) Inter-Union Commission "Triple Commission for Spectroscopy":
by (Mrs) Ch. Moore-Sitterly and J. G. Phillips (as members) and J. Racah as corresponding member.
- (i) Inter-Union Commission on Atmospheric Research:
by J. E. Blamont.
- (j) Working Group on Solar-Terrestrial Physics:
by C. W. Allen.

Other organizations. The Union is represented on:

- (a) The Board of the International Foundation of the Pic-du-Midi: by A. Danjon.
- (b) Comité Consultatif pour la Définition de la Seconde, du Bureau International des Poids et Mesures: by W. Markowitz and N. Stoyko.
- (c) Comité Consultatif pour la Définition du Mètre, du Bureau International des Poids et Mesures: by (Mrs) Ch. Moore-Sitterly.
- (d) International Ursigram and World Days Service (IUWDS): by R. Michard.

Representation. The Union was represented at various meetings as follows: the eighteenth International Congress of Pure and Applied Chemistry, in Montreal in August 1961, by G. Herzberg; the twelfth International Astronautical Congress, in Washington, D.C. in October 1961, by F. L. Whipple; the thirteenth General Assembly of the International Union of Geodesy

and Geophysics, in Berkeley, California in August 1963, by H. Friedman; and the fourteenth General Assembly of the International Union of Scientific Radio, in Tokyo in September 1963, by C. W. Allen.

Publications

A detailed list of publications issued during the period under review is given in Appendix III. Full details of these publications, including prices and procedures for purchasing copies, have already appeared in the *Information Bulletins*.

Transactions and Draft Reports. Volume XI of the *Transactions* was published in two separate volumes as follows:

Vol. XIA Reports on Astronomy, May 1962

Vol. XIB Proceedings of the eleventh General Assembly, December 1962

Both volumes were published for the Union by Academic Press (Inc.) London Ltd. A similar arrangement has been made in respect of Volume XII, though no final decision has yet been made as to how it will be divided into separate volumes.

The *Agenda and Draft Reports*, in which this Report is included, follows the general form introduced in 1961; in addition to the Reports of the Executive Committee and the Draft Reports of the Commissions, it contains also the formal agenda for the twelfth General Assembly and, as far as practicable, the principal items of agenda and subjects for discussion for the meetings of Commissions in Hamburg. It has been edited by the Assistant General Secretary, Dr J.-C. Pecker.

Symposium volumes. A full list of the volumes published in the three years 1961 to 1963 is given in Appendix III. The arrangements for publication of the proceedings of the symposia already held are as follows:

| No. | Subject | Arrangements for publication |
|-----|--------------------------------------|--|
| 19 | Site Testing | To be reprinted from <i>Bulletin Astronomique</i> |
| 20 | The Galaxy and the Magellanic Clouds | To be published for the Union by CSIRO and the Australian Academy of Science |
| 21 | The System of Astronomical Constants | To be reprinted from <i>Bulletin Astronomique</i> |
| 22 | Stellar and Solar Magnetic Fields | To be published by North Holland Publishing Co. |

No arrangements have yet been made in respect of the proceedings of Symposia nos. 23, 24, 25 and 26 to be held in 1964; as mentioned earlier, it is hoped that it may be possible to standardize publication arrangements in the future.

The proceedings of the Colloquium on 'Star Clusters and Stellar Evolution' are being published as a *Royal Observatory Bulletin*.

The proceedings of the Colloquium on the 'Transfer of Radiation in Stellar Atmospheres' are being published as a special issue of the *Journal of Quantitative Spectroscopy and Radiation Transfer* by Pergamon Press Ltd.

List of IAU Publications. A *Provisional List of IAU Publications* was circulated with *Information Bulletin* no. 2 in November 1959; the response to the request for information, in respect of those publications for which the data given were incomplete, or even omitted entirely, has been disappointingly small. Although the list can now easily be brought up to date, and its lay-out and format improved, it will still not be possible to complete the many gaps in the information given for the 'publications', sponsored by the Union, which were issued by Commissions, Observatories or individuals without formal publication.

THE FINANCIAL SITUATION

Introduction

In accord with the policy introduced in 1961 the Executive Committee presents to Members a single 'Summarized Account of Receipts and Payments' covering the period from 1 January 1961 to 31 December 1963. All amounts in other currencies have been converted to U.S. dollars at the following adopted conversion rates, treated as exact:

£1 sterling = \$2.80 \$1 = 4.90 French (new) francs = 3.80 Dutch guilders

The Dutch account was closed on 29 August 1962, and the balance transferred to the sterling account; owing to the favourable exchange rate at that time there was a small surplus on exchange which, taking into account other fluctuations, has resulted in an overall surplus of some \$39.

The summarized account has been derived from the eleven (one for each year and each currency) individual accounts of receipts and payments, which were the only accounts published up to 1958; these are again omitted from this Report, but will be available for examination by the Finance Committee at the twelfth General Assembly. As recommended by the Finance Committee at the eleventh General Assembly in Berkeley in August 1961, the summarized account, as well as the individual accounts, has been audited, and certified as correct, by the Union's professional accountants.

It must be emphasized that these accounts are simply statements of receipts and payments; no attempt has been made to allow, by the provision of reserves, for income and expenditure appropriate to the period but not included in the actual receipts and payments. Specific attention is called, in the explanatory notes to the accounts, to any outstanding balances that should be taken in consideration in assessing the overall results. The three-year period is, however, the natural unit and only minor adjustments are necessary.

Since the unit of contribution to the Union is expressed in gold francs, it is desirable to state the relationship between the gold franc and the U.S. dollar, which is:

1 gold franc = 0.29032 25 gramme of fine gold = 0.3266 U.S. dollar
1 U.S. dollar = 3.06185 gold francs

Summarized Account of Receipts and Payments

The statement on pages 62 and 63 is a simple account of receipts and payments, collected for convenience under a few main headings. The following explanatory notes provide more detailed information in relation to each item of the accounts.

Receipts

1. *Subscriptions.* The unit of contribution is fixed by the General Assembly and was 500 gold francs (\$163.30) for 1961 and 600 gold francs (\$195.96) for 1962 and 1963. The number of units received is only an indication, since payments are often not for the exact amount so that small balances are carried forward from year to year. On 31 December 1963, nine countries were in arrear with their subscriptions to the extent of a total of approximately sixteen units of contribution.

2. *Sales of publications.* Owing to the complexity of the accounts from the printers and publishers, and the many different arrangements for the sale of symposium volumes, it has been judged to be impracticable to give precise figures for the receipts from sales for each publication separately; in many cases the Union receives payment from Members which is subsequently passed on to the publishers, and these may not always have been cancelled. Accordingly, both payments for publications and receipts from sales may be slightly increased by the same amount.

REPORT OF EXECUTIVE COMMITTEE

STATEMENT OF RECEIPTS AND PAYMENTS, 1961-1963

Receipts, 1961-1963

| | | U.S. dollars | U.S. dollars | | |
|---|--|-----------------|--------------------------------------|--------------|----------------|
| 1. Subscriptions from 42 adhering countries | | | | | |
| | <i>No. of units</i> | | | | |
| <i>Year</i> | <i>due</i> | <i>received</i> | | | |
| 1961 | 121 | 127 | equivalent, after conversion, to the | | |
| 1962 | 121 | 119 | following actual receipts | | |
| 1963 | 125 | 123 | (including 5 for 1964) | | |
| | | | \$ 20 927·90 | | |
| | | | 22 815·65 | | |
| | | | 24 040·58 | | |
| | | | <hr/> | | |
| | | | \$ 67 784·13 | | |
| 2. Sales of Publications | | | | | |
| (a) | <i>Transactions</i> | | 4 761·40 | | |
| (b) | Symposia and sundry publications | | 3 603·50 | | |
| (c) | Reprints from the <i>Transactions</i> , Vols. XIA and B | | 667·07 | | |
| (d) | <i>Astronomical News Letters</i> | | 594·20 | | |
| (e) | Subscriptions from Institutions on the Distribution List | | | | |
| | —for the year 1963 | | 2 266·19 | | |
| | —for the years 1964 and 1965 | | 2 938·46 | | |
| | | | <hr/> | | |
| | | | 14 830·82 | | |
| | | | 7 386·53 | | |
| 3. Interest on Savings and other Accounts | | | | | |
| 4. Subventions from UNESCO, through ICSU | | | | | |
| | grants allocated for: | | | | |
| year | meetings | symposia | publications | Com. 38 | |
| 1961 | 7 500 | 3 000 | 4 500 | 3 000 | 18 000·00 |
| 1962 | | 5 000 | 5 000 | 5 000 | 15 000·00 |
| 1963 | | 7 500 | 3 500 | 3 000 | 14 000·00 |
| | | | | | <hr/> |
| | | | | | 47 000·00 |
| 5. Contract with UNESCO for Symposium no. 20 | | | | 5 000·00 | |
| 6. Sundry Receipts | | | | | |
| (a) | Symposium no. 12 (refund of travel expenses) | | 210·00 | | |
| (b) | Commission 24 (refund) | | 162·78 | | |
| | | | <hr/> | | |
| | | | | | 372·78 |
| 7. Surplus on Exchange | | | | 39·13 | |
| | | | | | <hr/> |
| | | | | | TOTAL RECEIPTS |
| 8. Excess of Payments over Receipts, carried down | | | | \$142 413·39 | |
| | | | | | 2 819·95 |
| | | | | | <hr/> |
| | | | | | \$145 233·34 |
| | | | | | <hr/> |
| | | | | | <hr/> |
| | | | | | \$112 349·97 |

We have examined the annexed Summarized Account of Receipts and Payments, together with the annexed Summary of Balances, of the International Astronomical Union for the period of 3 years ended 31 December 1963. We have also examined the five separate Lists of Payments which are set out under their respective headings in the Report of the Executive Committee on the Financial Situation of the Union.

The said Accounts and Lists have been compared with the books of the Union and with the receipts and vouchers produced to us. We hereby certify that the said Accounts and Lists are in accordance therewith and with the information and explanations which we have required for the purpose of our audit.

Bexhill-on-Sea, Sussex, England.
11 March 1964

HAMILTON & WILTON
Chartered Accountants

STATEMENT OF RECEIPTS AND PAYMENTS, 1961-1963

Payments, 1961-1963

| | U.S. dollars | U.S. dollars |
|--|----------------|--------------|
| 1. Expenses of the Administrative Office | | |
| See separate List | | \$15 597·22 |
| 2. Subscriptions to the ICSU | | 1 205·19 |
| 3. Expenses of Commissions—None claimed | | — |
| 4. Specific Projects approved by the General Assembly | | |
| See separate List | | 42 158·94 |
| 5. Expenses of the General Assembly, Berkeley, August 1961 | | |
| (a) Travel grants for Executive Committee, advisers and Presidents of Commissions | \$13 350·00 | |
| Less contribution by U.S. National Academy of Sciences | 2 630·74 | |
| | <hr/> | |
| | 10 719·26 | |
| (b) Travel grants for Young Astronomers | 3 000·00 | |
| (c) Other expenses | 2 519·00 | |
| | <hr/> | |
| | | 16 238·26 |
| 6. Printing of Draft Reports and <i>Transactions</i> | | |
| (a) Draft Reports 1961 and <i>Transactions</i> Vols. XIA and B | 21 930·17 | |
| (b) Balance for <i>Transactions</i> Vol. X (including reprints) | 3 344·77 | |
| (c) Reprints from <i>Transactions</i> Vols. XIA and B | 1 092·00 | |
| | <hr/> | |
| | | 26 366·94 |
| 7. Meetings of the Executive Committee | | |
| (a) Erevan, September 1962 | 2 622·94 | |
| (b) Liège, July 1963 (including expenses—\$111·25—of meeting on "Training of Astronomers") | 2 039·91 | |
| | <hr/> | |
| | | 4 662·85 |
| 8. Travel and organizational expenses of Symposia | | |
| See separate List | | 14 478·16 |
| 9. Publication of the Proceedings of Symposia | | |
| See separate List | | 11 821·38 |
| 10. Meetings of Inter-Union Commissions | | |
| (a) Contributions to IUCAF | 5 500·00 | |
| (b) Travel grant to attend meeting of IUCSTR | 500·00 | |
| | <hr/> | |
| | | 6 000·00 |
| 11. Representation Expenses | | |
| (a) Travel grant for discussions on International Year of the Quiet Sun | 72·80 | |
| (b) Travel grant to attend the ICSU meetings, Vienna | 246·53 | |
| | <hr/> | |
| | | 319·33 |
| 12. Projects authorized by the Executive Committee | | |
| See separate List | | 6 385·07 |
| | | <hr/> |
| | TOTAL PAYMENTS | \$145 233·34 |
| | | <hr/> |
| | | 2 819·95 |
| <i>Summary of Balances</i> | | |
| 13. Excess of Payments over Receipts, carried down | | 2 819·95 |
| Balances: 31 December 1963 | | |
| (a) in three bank current accounts | \$46 799·18 | |
| (b) in five bank savings accounts | 62 730·84 | |
| | <hr/> | |
| | | 109 530·02 |
| | | <hr/> |
| | | \$112 349·97 |

The receipts from the sales of the *Transactions* and symposium volumes, given here separately, are only a little more than in the previous period of three years. It must be remembered that the *Transactions* are distributed free to all Institutions on the Distribution List, as well as to all Members of the Union, so that a large sale cannot be expected; moreover, for most of the symposium volumes the Union gets no receipts from sales, as the arrangements with the publishers allow only sufficient copies to the Union for free distribution to Institutions and to participants in the symposia.

The receipts from the sale of reprints are much less than the cost, mainly because many reprints from the *Transactions* (Invited Discourses, Joint Discussions, List of Members, etc.) are distributed without charge.

Publication of the *Astronomical News Letters* ceased at the end of 1961, so that the receipts are for one year only.

Subscriptions from Institutions on the Distribution List were started for the year 1963, but some payments have been made, in advance, for the years 1964 and 1965. It is hoped that many Institutions, which have not yet responded to the invitation to subscribe, will still do so, starting with 1963. This is an entirely new source of revenue, but it only covers a small fraction of the actual cost of supplying the Union's publications to Institutions.

3. *Interest.* The interest on the money in the savings accounts has been allowed to accumulate, and has been added to the balances of those accounts.

4. *Subvention from UNESCO.* This is administered through the International Council of Scientific Unions, which exercises financial control; full accounts (not given here) of the expenditure of the subvention are returned each year to the ICSU and to UNESCO. Although the subvention is made up of grants allocated for specific purposes, it is possible, without formality, to transfer such grants from one purpose to another, provided it is within the permitted UNESCO category.

5. *Contract with UNESCO.* The Union negotiated a separate contract with UNESCO in respect of the organization of Symposium no. 20 (The Galaxy and the Magellanic Clouds) in Australia.

6. *Sundry receipts.* These are refunds in 1961 of grants paid in 1960 and, for some reason, not fully used.

7. *Surplus on exchange.* The surplus arises primarily because of the favourable exchange rate at the time of closing the Dutch account.

Payments

The headings have been numbered to correspond to those of the budget approved by the General Assembly in Berkeley in August 1961.

1. *Expenses of the Administrative Office.* The following list gives details of certain special items of expenditure:

| | U.S. dollars |
|---|--------------|
| General Office and miscellaneous expenses | \$12 730.36 |
| Printing of <i>Information Bulletins</i> | 2 231.66 |
| Printing of Resolutions on Space Contamination | 41.58 |
| Printing of Preliminary Announcement for the twelfth General Assembly | 346.17 |
| Expenses of visits to Hamburg for discussions on the twelfth General Assembly | 247.45 |
| | <hr/> |
| | \$15 597.22 |

The General Office expenses include the travel expenses of the General and Assistant General Secretaries (except for specific meetings), and some capital expenditure (typewriter, duplicator, etc.) as well as salaries, social security and pension payments, and all normal office expenses.

2. *Subscriptions to the ICSU.* The Union makes a contribution towards the administrative expenses of the ICSU to the extent of 2 per cent of the income from subscriptions for the previous year; the figure therefore relates to the income for the years 1960, 1961 and 1962.

3. *Expenses of Commissions.* So far no application for expenses incurred in the conduct of the affairs of Commissions has been submitted.

4. *Specific projects approved by the General Assembly.* Full details of the allocations approved by the General Assembly are given in the reports of the Finance Committee as printed in the *Transactions (Trans. IAU 10, 71, 1960 for the year 1961 and 11B, 39 and 83, 1962 for the years 1962 and 1963).*

Details of the actual expenditure on these projects are given in the following list:

| Commission no. | Project | Payments U.S. dollars |
|----------------|--|-----------------------|
| 5 | <i>Astronomical News Letter (1961 only)</i> | \$ 1 784.05 |
| 5 | <i>Bibliography of Astronomy (visit of Dr Kleczek to Antwerp)</i> | 170.00 |
| 6 | <i>IAU Telegram Bureau</i> | 1 856.32 |
| 10 | <i>Cartes héliographiques de la Photosphère</i> | 980.32 |
| 10 | <i>Cartes synoptiques de la Chromosphère solaire</i> | 2 646.00 |
| 12 | <i>Solar Spectrum Wavelength Tables</i> | 3 960.00 |
| 20 | <i>Minor Planet Center, at Cincinnati (1961 only)</i> | 750.00 |
| 20 | <i>Catalogue of Cometary Orbits</i> | 1 400.00 |
| 23 | <i>Carte du Ciel</i> | 13 390.25 |
| 27 | <i>English version of remarks to the supplement of the second edition of the 'General Catalogue of Variable Stars'</i> | 703.34 |
| 38 | <i>Exchange of Astronomers</i> | 14 518.66 |
| Total | | \$42 158.94 |

No expenditure was possible on the publication of the *Bibliography of Astronomy, 1881-1898*; but payment was made in respect of the visit of the President of Commission 5 to Antwerp in September 1963. Payment for only one year has again been needed by the Minor Planet Center. Approval for the grants for the publication of both the *Solar Spectrum Wavelength Tables* and the *Catalogue of Cometary Orbits* was given at earlier General Assemblies. Payment of the whole cost of the 'English version of the remarks to the second edition of the General Catalogue of Variable Stars' was made, although it was more than originally estimated.

There are, as on 31 December 1963, unspent credits in favour of the *Carte du Ciel* of about \$4000 and of Commission 38 of about \$8000; in both cases all payments are made by the Administrative Office on instructions from the Presidents of the respective Commissions.

5. *Expenses of the General Assembly, Berkeley, August 1961.* The two main items of expenditure for the Union in connection with a General Assembly are those listed under (a) and (b). In 1961 the amounts so spent were very small in comparison with the grants made from the U.S. fund to participants in the symposia and the General Assembly. Through the generosity of the host countries, the incidental expenses associated with the organization of the meetings are usually small and bear little relation to the total cost; the items included under (c) mainly consist of travel expenses for the General Secretary and Assistant General Secretary.

6. *Printing of Draft Reports and Transactions.* The cost of printing the *Transactions* is one of the main sources of expenditure for the Union. By a change of printer, Volume XI of the *Transactions*,

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together with the *Agenda and Draft Reports*, have cost only about 25 per cent more than the corresponding Volume X, although Volume XI consists of two separate volumes (total of 1100 pages) as compared with the single Volume X (of about 770 pages). Although some payments in respect of Volume X were still outstanding on 1 January 1961, all payments for Volume XI have now been made.

Only part of the cost of reprints is recovered from authors, since many copies are distributed free.

7. *Meetings of the Executive Committee.* The amounts given include all incidental expenses as well as the cost of travel and subsistence; that they are so small is a measure of the success attained by members of the Executive Committee in combining the meetings with other business. Much also is owed to the generosity of the host countries and of the organizations at whose invitations the meetings were held. The expenses of the meeting in Berkeley in August 1961 are included in those of the General Assembly.

The expenses of the Liège meeting include an amount of \$111.25 in respect of an additional meeting on the 'Training of Astronomers' (travel expenses for additional participants).

8. *Travel and organizational expenses of Symposia.* The main cost of the symposia lies in the contribution made by the Union towards the travelling expenses of the participants; this is supplemented sometimes by a grant towards organizational and secretarial expenses, but, as with other activities, considerable expense is always borne by the host organization. It is not always possible to allocate the whole sum granted by the Executive Committee, as individual grants are often returned when it is too late for them to be re-allocated.

Details of the actual payments made are given in the following list.

| Symposium no. | Subject; place, date | Payments U.S. dollars |
|------------------|--|--------------------------|
| 14 | The Moon; Leningrad, December 1960 | \$ 441.00 |
| 15 16 17 | Problems of Extra-Galactic Research; Santa Barbara | |
| | The Solar Corona; Cloudcroft | |
| | Visual Double Stars; Berkeley | |
| | All held in August 1961 in connection with the eleventh General Assembly; together | 3 293.62 |
| 18 | Theoretical Interpretation of Upper Atmosphere Emissions; Paris, June 1962 | 1 400.00 |
| 19 | Site Testing; Rome, October 1962 | 1 931.00 |
| 20 | The Galaxy and the Magellanic Clouds; Canberra and Sydney, March 1963 | 5 006.00 |
| 21 | The System of Astronomical Constants; Paris, May 1963 | 1 633.45 |
| 22 | Stellar and Solar Magnetic Fields; Rottach-Egern, near Munich, September 1963 | 773.09 |
| | | <hr/> \$14 478.16 |

The grants made in respect of Symposia nos. 15, 16 and 17 were part of the complicated procedure for providing travel grants for the General Assembly in Berkeley; they cannot easily be separated.

9. *Publication of the proceedings of Symposia.* Separate publication arrangements are made for each symposium, depending on the public appeal of the subject, the length of the proceedings, and its suitability for publication in a particular scientific journal. The details of each arrangement vary, and it is not practicable to give them in full. Details of the actual payments, which include editorial costs where relevant, are given in the following list.

| Symposium no. | Title and form of publication | Payments U.S. dollars |
|---------------|---|-----------------------|
| 12 | <i>Aerodynamical Phenomena in Stellar Atmospheres</i> . Reprinted from <i>Il Nuovo Cimento</i> | \$ 2 715.00 |
| 13 | <i>The Future of the International Latitude Service</i> . Reprinted from <i>Bulletin Géodésique</i> | 582.98 |
| 14 | <i>The Moon</i> . Published by Academic Press (London) | 4 334.45 |
| 15 | <i>Problems of Extra-Galactic Research</i> . Published by the Macmillan Co. of New York | 105.00 |
| 16 | <i>The Solar Corona</i> . Published by Academic Press (New York) | 2 631.45 |
| 17 | <i>Visual Double Stars</i> . Reprinted from <i>Publ. astr. Soc. Pacif.</i> | 0.00 |
| 18 | <i>Theoretical Interpretation of Upper Atmosphere Emissions</i> . Reprinted from <i>Planetary and Space Science</i> | 1 452.50 |
| | | \$11 821.38 |

Generally, the Union will not receive royalties on future sales, but will do so in respect of nos. 14 and 16. The Union also holds the stock of nos. 12 and 13. In the case of no. 12, the Union arranged to supply IUTAM (which jointly organized the symposium) with copies; the cost (\$386.40) was re-imbursed by IUTAM and is included in both the payments and in the receipts from sales.

No payments are outstanding on any of the publications listed; but payments would normally have been made before 31 December 1963 in respect of the publication of the proceedings of Symposia nos. 19, 20 and 21, all of which have been delayed.

10. *Meetings of Inter-Union Commissions*. The Inter-Union Commission on the Allocation of Frequencies for Radio Astronomy and Space Science (IUCAF) has had a very difficult, and expensive, task in presenting its views (so successfully) to the Extraordinary Administrative Radio Conference of the ITU.

11. *Representation expenses*. The payments in (b) were to enable the Assistant General Secretary to attend the General Assembly of the International Council of Scientific Unions in Vienna, in November 1963.

12. *Projects authorized by the Executive Committee*. In the exercise of its authority, specifically delegated to it by the eleventh General Assembly, the Executive Committee specifically authorized the payments in the following list.

| Ref. Commission no. | Project | Payments U.S. dollars |
|---------------------|---|-----------------------|
| (a) 16 | Centre de documentation pour l'observation des planètes | \$2 000.00 |
| (b) 26 | <i>Catalogue Général de 3350 Etoiles Doubles</i> . . . (additional payment) | 251.63 |
| (c) 29a | Informal Colloquium, Meudon, September 1960 | 81.63 |
| (d) 33 | <i>Tables for the Conversion of Galactic Co-ordinates</i> (Lund Observatory Annals) | 1 808.80 |
| (e) 33b | Reprints of report on 'New IAU System of Galactic Co-ordinates' | 174.01 |
| (f) 37 | Informal Colloquium 'Star Clusters and Associations', Herstmonceux, August 1962 | 408.80 |

To be carried forward \$4 727.87

| Ref. Commission no. | Project | Payments U.S. dollars |
|------------------------|--|--------------------------|
| | Carried forward | \$4 727·87 |
| (g) 19 | Travel expenses for Dr B. Guinot to visit Mizusawa, Japan, in connection with the International Polar Motion Service | \$1 460·20 |
| | <i>Less</i> contribution from FAGS | 500·00 |
| (h) 27 | Southern Variable-Star Charts | 960·20 |
| (i) — | Contributions to Fondation Internationale du Pic-du-Midi | 500·00 |
| | | 200·00 |
| | | <hr/> \$6 385·07 |

(a) is a project which would normally have been approved by the General Assembly, if it had been possible to propose it in Berkeley; excellent progress is being made in the collection of photographs.

(b) represents a supplementary payment, arising because of the increased size of the volume.

(c) and (f) are examples of the informal colloquia, which can now attract small grants from the Union.

(d), (e) and (i) are continuations of projects to which contributions have previously been made.

(g) arose largely because of the death of Dr T. Hattori, then director of the International Polar Motion Service; the I.P.M.S. is now working well under the direction of Dr S. Yumi.

(h) represents a small grant to aid the publication of the Southern Variable-Star Charts, previously paid for privately; Commission 27 will probably wish to propose a further grant at the General Assembly.

More explanation of these projects will be found in other sections of the Report of the Executive Committee.

Statement of balances

The statement of balances on pages 62 and 63 reveals a decrease of \$2819·95 in the total balances at the disposal of the Union, but an increase of \$7342·19, entirely due to the accumulation of interest, in the balances of the savings accounts. No money was transferred to the savings accounts during this period. At various times the Executive Committee has considered the desirability of investing the Union's reserves in international securities, but certain difficulties have so far prevented this.

The overall deficit is not serious in itself, but it has only been kept so low by rigid economies, particularly in regard to the provision for the Administrative Office and for symposia. The two unforeseen additional sources of income (\$5200 from subscriptions from Institutions and \$5000 from the contract with UNESCO) were essentially balanced by the three items of expenditure which should have been paid in the previous period (\$3345 for Volume X of the *Transactions*, \$3960 for the *Solar Spectrum Wavelength Tables* and \$1400 for the *Catalogue of Cometary Orbits*).

The Budget

At the eleventh General Assembly a budget of expenditure for the period of 1 January 1962 to 31 December 1964 was adopted (*Trans. IAU 11B*, 39, 1962), with the provision that a supplementary budget for the period 1 January 1964 to 31 December 1964 would probably be necessary at the twelfth General Assembly in August 1964. The budget provided for an expenditure of \$131 876 out of an estimated income of \$132 000 for the three years 1962, 1963 and 1964.

The actual payments and receipts in the two years 1962 and 1963, according to the audited accounts but modified to exclude certain self-balancing items, are \$87 109 and \$96 184 respectively; both are higher than estimated. The main reason for the increase in expenditure over the estimate is the much higher cost of printing and publishing the *Transactions* and the symposium volumes. Part of this is due to what can only be regarded as an error in the estimated cost of Volumes XIA and XIB of the *Transactions* (\$12 000 instead of \$15 800 plus the cost of the Draft Reports in 1964); and part is due to the much higher cost of supplying free copies of the symposium volumes to Institutions (the actual cost was \$10 850 in 1962 and 1963 alone, as compared with the estimate of \$8000 for the three years). However, the income has shown an increase over the estimate, largely due to the introduction of subscriptions from Institutions and the contract with UNESCO. With an estimated income in 1964 of \$47 200 the total income for the three years is \$143 384, an increase of \$11 508 over the budgeted expenditure.

For various reasons 1964 will be a year of heavy expenditure: the Administrative Office will be moved; payment will have to be made for four symposium volumes (nos. 19-22) in progress of publication; and, of course, it is a year of General Assembly. The estimated budgetary requirement, excluding any addition to the sum set aside for the General Assembly, is \$63 110; this estimate can, of course, be improved at the time of the General Assembly itself. This sum represents an increase over the \$131 876 of the three-year budget of \$18 343; this must be offset against the estimated increase of income of \$11 508, leaving an estimated deficit of \$6835.

| To summarize: | Income U.S. dollars | Expenditure U.S. dollars |
|---|------------------------|-----------------------------|
| Actual figures (adjusted) for 1962 and 1963 | \$96 184 | \$87 109 |
| Estimated figures (February 1964) for 1964 | 47 200 | 63 110 |
| Revised estimated figures (February 1964) for 1962-1964 | 143 384 | 150 219 |
| Budget estimate (August 1961) for 1962-1964 | 131 876 | 131 876 |
| Increase (February 1964 minus August 1961) | 11 508 | 18 343 |
| | | <hr/> |
| Estimated excess of Expenditure over Income | | \$6 835 |

The Finance Committee at the twelfth General Assembly will accordingly be asked to approve a supplementary budget for the year 1964, together with a comprehensive budget for the following period of three years.

APPENDIX I. LIST OF COUNTRIES ADHERING TO THE UNION

In the following list are given the 42 countries that adhere to the Union in December 1963, together with the year of adherence, the approximate number of Members, and the Adhering Organizations.

| Country | Year | No. | Adhering Organization |
|--|------|-----|---|
| Argentina | 1927 | 13 | Comité Nacional de Astronomía, La Plata. |
| Australia | 1939 | 33 | Australian Academy of Science, Canberra. |
| Austria | 1955 | 10 | Österreichische Akademie der Wissenschaften, Wien. |
| Belgium | 1920 | 38 | Académie Royal de Belgique, Bruxelles. |
| Brazil | 1961 | 3 | Conselho Nacional de Pesquisas, Rio de Janeiro. |
| Bulgaria | 1957 | 1 | Bulgarische Akademie der Wissenschaften, Sofia. |
| Canada | 1920 | 38 | Department of Mines and Technical Surveys, Ottawa. |
| Chile | 1947 | 3 | Observatorio Astronómico Nacional, Universidad de Chile, Santiago de Chile. |
| Czechoslovakia .. | 1922 | 25 | Academy of Sciences, Prague. |
| Denmark | 1922 | 12 | Det Kongelige Danske Videnskabernes Selskab, København. |
| Eire | 1947 | 3 | Dublin Institute for Advanced Studies. |
| Finland | 1948 | 8 | Académie des Sciences et Lettres, Helsinki. |
| France | 1920 | 107 | Académie des Sciences, Paris. |
| Germany (Democratic Republic of) | 1951 | 16 | Deutsche Akademie der Wissenschaften zu Berlin. |
| Germany (Federal Republic of) | 1951 | 83 | Council of West German Observatories, Heidelberg. |
| Great Britain .. | 1920 | 121 | Royal Society, London. |
| Greece | 1920 | 9 | Academy of Athens, Athens. |
| Hungary | 1947 | 6 | Hungarian Academy of Sciences, Budapest. |
| India | 1946 | 12 | Government of India, Ministry of Scientific Research and Cultural Affairs, New Delhi. |
| Israel | 1954 | 1 | The Israel Academy of Sciences and Humanities, Jerusalem. |
| Italy | 1921 | 37 | Consiglio Nazionale delle Ricerche, Roma. |
| Japan | 1920 | 33 | Science Council of Japan, Tokyo. |
| Korea (Popular Democratic Republic of) | 1961 | — | Academy of Sciences of the Popular Democratic Republic of Korea, Pyongyang. |
| Lebanese Republic | 1954 | 1 | National Lebanese Committee for Astronomy, Ksara. |
| Mexico | 1921 | 9 | Universidad Nacional, Mexico, D.F. |
| Netherlands .. | 1922 | 29 | Koninklijke Nederlandse Akademie van Wetenschappen, Amsterdam. |
| Norway | 1922 | 10 | Det Norske Videnskaps-Akademi, Oslo. |
| Poland | 1922 | 24 | Polska Akademia Nauk, Warszawa. |
| Portugal | 1924 | 10 | Government, Lisbon. |
| Rumania | 1928 | 7 | Comitetul National Astronomic, Bucarest. |
| South Africa .. | 1938 | 8 | South African Council for Scientific and Industrial Research, Pretoria. |
| Spain | 1922 | 13 | Comisión Nacional de Astronomía, Madrid. |
| Sweden | 1925 | 24 | Kungl. Vetenskapsakademien, Stockholm. |
| Switzerland .. | 1923 | 12 | Schweizerische Naturforschende Gesellschaft, Zürich. |
| Taiwan (The Republic of China) | 1959 | 8 | Astronomical Society of the Republic of China, Taipei. |
| Turkey | 1961 | 7 | Turkish Astronomical Society, Istanbul. |

| Country | Year | No. | Adhering Organization |
|------------------------------|------|-----|--|
| United Arab Republic (Egypt) | 1925 | 8 | Astronomical Center at Helwan, Egyptian Region. |
| United States .. | 1920 | 334 | National Research Council, Washington. |
| U.S.S.R. | 1935 | 155 | Academy of Sciences of the U.S.S.R., Moscow. |
| Vatican City State | 1932 | 4 | Pontificia Accademia delle Scienze i Nuovi Lincei, Rome. |
| Venezuela .. | 1953 | 1 | Academia de Ciencias Fisicas Matematicas y Naturales, Caracas. |
| Yugoslavia .. | 1935 | 8 | Conseil Fédéral de la Recherche Scientifique, Belgrade. |

APPENDIX II. LIST OF DECEASED MEMBERS

The Executive Committee regrets to record the loss by death of the following 32 Members of the Union:

| | | | |
|-----------------------|-------------------|---------------------|-------------------|
| C. F. Baeschlin | | E. Lange | 26 January 1961 |
| J. Cabannes | 31 October 1959 | K. Lassovszky | 20 December 1961 |
| E. F. Carpenter | 11 February 1963 | R. McMath | 2 January 1962 |
| G. Contino | | P. W. Merrill | 19 July 1961 |
| D. Cot | 23 March 1961 | S. B. Nicholson | 2 July 1963 |
| A. K. Das | 18 February 1961 | N. V. E. Nordenmark | 2 February 1962 |
| I. A. Dyukov | 25 June 1961 | V. Oberguggenberger | 2 March 1963 |
| W. Dziewulski | 6 February 1962 | J. L. Pawsey | 30 November 1962 |
| M. A. Ellison | 12 September 1963 | C. A. Shain | |
| Mme. G. C. Flammarion | 28 October 1962 | H. Siedentopf | 28 November 1963 |
| A. Gennaro | 30 May 1962 | H. S. Spigl | 20 August 1962 |
| E. Guyot | 10 January 1963 | O. Struve | 6 April 1963 |
| D. L. Harris III | 29 April 1962 | P. ten Bruggencate | 19 September 1961 |
| T. Hatanaka | 10 November 1963 | G. Thiessen | 3 July 1961 |
| T. Hattori | 9 March 1962 | O. Thomas | |
| M. B. B. Heath | 21 November 1963 | J. G. E. G. Voûte | 20 August 1963 |

APPENDIX III. LIST OF PUBLICATIONS

| | |
|--|---|
| <i>Transactions of the IAU</i> , Volumes XIA and XIB | Published by Academic Press (Inc.) London Ltd. |
| IAU Symposium Volumes | |
| No. 12 <i>Aerodynamic Phenomena in Stellar Atmospheres</i> | Editor: R. N. Thomas Reprinted from <i>Il Nuovo Cimento</i> . |
| No. 13 <i>The Future of the International Latitude Service</i> | Editor: P. Melchior Reprinted from <i>Bulletin Géodésique</i> . |
| No. 14 <i>The Moon</i> | Editors: Z. Kopal Z. K. Mikhailov Published by Academic Press, London. |
| No. 15 <i>Problems of Extra-Galactic Research</i> | Editor: G. C. McVittie Published by the Macmillan Co. |
| No. 16 <i>The Solar Corona</i> | Editor: J. W. Evans Published by Academic Press, New York. |

LIST OF PUBLICATIONS (*continued*)

- No. 17 *Visual Double Stars* Editor: S. L. Lippincott
Reprinted from *Publications of the Astronomical Society of the Pacific*.
- No. 18 *Theoretical Interpretation of Upper Atmosphere Emissions* Editor: D. R. Bates
Reprinted from *Planetary and Space Science*.

Publications by, or on behalf of, Commissions

- Commission 5:
Astronomical News Letters nos. 102-109 Editor: V. Kourganoff
Published and distributed by
Laboratoire d'Astronomie de
Lille. (Now discontinued.)
- Commission 6:
IAU Circulars nos. 1748-1873 Issued by the 'Bureau Central des
Télégrammes Astronomiques'.
- Commission 10:
Heliographic Charts of the Photosphere
Volume XI, no. 5
Volume XII, nos. 1 and 2 Published by the Eidgen. Stern-
warte in Zürich, under the direc-
tion of M. Waldmeier.
- Commission 10:
Cartes Synoptiques de la Chromosphère Solaire
Volume III, fascicule 1
Volume IV, fascicules 1 and 2 Prepared by Observatoire de Paris
at Meudon, under the direction
of R. Michard.
- Commission 20:
Minor Planet Circulars nos. 2041-2243 Mimeographed Circulars issued by
the Minor Planet Center in
Cincinnati.
- Commission 23:
Astrographic Catalogues
Tacubaya Zone Prepared under the direction of
Mrs Paris Pishmish.
Volume VI, Part II; Declination -11° , 12^{h} - 24^{h}
Volume VII, Part I; Declination -10° , 0^{h} - 12^{h}
Volume VII, Part II; Declination -10° , 12^{h} - 24^{h}
Uccle-Paris Zone Prepared by P. Couderc.
Volume I; Declination $+34^{\circ}$
Volume II; Declination $+35^{\circ}$
Melbourne Zone Prepared by H. W. Wood.
Volume VIII; Declination -82° to -90°
Catania Zone (reprints) Prepared under the direction of
M. G. Fracastoro.
Volume I, Part II; Declination $+46^{\circ}$ to $+48^{\circ}$
R.A. 3^{h} - 6^{h}
Volume II, Part II; Declination $+47^{\circ}$ to $+49^{\circ}$
R.A. 3^{h} - 6^{h}
- Commission 24:
A Catalogue of 7127 Stars in the Northern Hemisphere with Proper Motions exceeding 0.2 annually Prepared by W. J. Luyten.
- Commission 26:
Circulaires d'Information Prepared by P. Muller.
- Commission 26:
Catalogue général de 3350 étoiles doubles de faible éclat observées de 1906 à 1962. Prepared by R. Jonckheere.

LIST OF PUBLICATIONS (*continued*)

Commission 27:

English Version of Remarks from the First Supplement to the Second Edition of the General Catalogue of Variable Stars Prepared by the President of Commission 27.

Commission 33:

New IAU System of Galactic Co-ordinates—1958 Revision Papers prepared by Sub-Commission 33b.

Commission 33:

Tables for the Conversion of Galactic Co-ordinates

Lund Observatory Table for the Conversion of Equatorial into Galactic Co-ordinates based on the Galactic Pole R.A. $12^{\text{h}} 49^{\text{m}}$; Decl. $+27^{\circ} \cdot 4$ (1950·0)

Lund Observatory Table for the Conversion of Galactic into Equatorial Co-ordinates based on the Galactic Pole R.A. $12^{\text{h}} 49^{\text{m}}$; Decl. $+27^{\circ} \cdot 4$ (1950·0)

Lund Observatory Table for Conversion of Galactic Co-ordinates from the System based on the Pole R.A. $12^{\text{h}} 40^{\text{m}}$; Decl. $+28^{\circ}$ (1900·0) into the System based on R.A. $12^{\text{h}} 49^{\text{m}}$; Decl. $+27^{\circ} \cdot 4$ (1950·0) and vice versa.

Prepared by Lund Observatory, with financial assistance from the Swedish Natural Science Research Council, under the direction of Dr Ingrid Torgård.

Information Bulletins nos. 5–11

Prepared by the General Secretary.

APPENDIX TO THE REPORT OF THE EXECUTIVE COMMITTEE

Dans le volume des *Agenda and Draft Reports* figuraient, à la suite des Rapports des Commissions 5, 6 et 38, deux rapports rédigés par les Groupes de Travail créés par le Comité Exécutif.

Le premier de ces rapports, issu du Groupe de Travail sur le Système des Constantes Astronomiques, est reproduit dans le présent volume, au début de la Joint Discussion F, page 593.

Le second de ces rapports est reproduit ci-après.

STATEMENT BY THE IAU WEST FORD COMMITTEE

The results of the present West Ford experiment

The results of the West Ford experiment and its effects on optical and radio astronomy, based on all data of which the Committee is aware, may be summarized as follows:

(a) *Optical observations.* Optical measurements of the surface brightness of sunlight scattered from the belt show that the surface brightness is in no case greater than that estimated in advance by van de Hulst and Volders; Morrow and MacLellan, or Liller (*Astr. J.* **66**, 105-118, 1961); or Blackwell and Wilson (*Quart. J. RAS* **3**, 109, 1962). Therefore we conclude that the intensity of the scattered light for any belt with properties similar to the West Ford belt can be adequately estimated by calculations like those already used to predict the surface brightness of the present belt.

No one has succeeded in measuring the possible polarization of the light scattered by the dipole belt.

(b) *Radio observations.* There is evidence that rather less than one-half of the dipoles in the present West Ford belt are effective as X-band scatterers. With this fact in mind, the intensity of the scattered radio energy can be estimated quite well for the present belt by methods such as those of Morrow and MacLellan, or Lilley (*Astr. J.* **66**, 105-118, 1961), or Lovell and Ryle (*Quart. J. RAS* **3**, 100, 1962), and can therefore be used for any similar proposed belt.

There is some evidence that the present belt is a more effective radio scatterer at lower than resonant frequencies (UHF) than would be true for a belt of single separated dipoles. It seems fairly well established that this larger than expected scattering cross section can be attributed to the fact that some fraction of the dipoles were in fact dispensed in clusters or chains.

(c) *Rate of belt dispersion and lifetime.* Experimental evidence on the rate of dispersion of the belt and the rate of decrease of its perigee height obtained for the first four months is in excellent agreement with theory, given for example by Shapiro and Jones (*Science* **134**, 973, 1961). This theory together with the larger area-to-mass ratio of the dipoles and with the orbital elements of the present experiment, leads to a predicted lifetime of about three years. We therefore have grounds to expect that the effective lifetime of the belt will be considerably shorter than originally anticipated, unless the resonance is destroyed by some factor not yet contemplated.

Conclusions from the study of the present experiment

(a) We conclude, as was originally forecast, that as of the time of this statement and with the observing techniques in use today the present West Ford experiment has not been harmful to either optical or radio astronomy.

(b) The predictions of the effects of the experiment have been reasonably well borne out by the observations. We may therefore rely on essentially the same methods to predict the effects of any experiments similar to the West Ford experiment which may possibly be proposed in the future, suitable allowance being made for the increased vulnerability that may be associated with future advances in observing techniques.

November 1963

J. W. FINDLAY
Secretary to the Committee

Added Note: In a letter dated 24 March 1964, Dr Findlay calls attention to the observed increasing orbital separation between the individual dipoles and the clusters of dipoles; the clusters may have a smaller area-to-mass ratio than the individual dipoles. Analysis of the observations and calculations of the probable lifetime are in progress. This newly learned development does not affect the conclusions above, or the statement that the mean lifetime of the individual dipoles will be of the order of three years.