## PART I

REPORTS AND RECOMMENDATIONS PRESENTED TO THE GENERAL ASSEMBLY BY THE EXECUTIVE COMMITTEE AND THE COMMISSIONS OF THE UNION

## EXECUTIVE COMMITTEE

## PRESIDENT:

Prof. W. De Sitter, Professor of Astronomy in the University of Leiden; Sterrewacht, Leiden, Holland.

## VICE-PRESIDENTS:

Dr H. A. Deslandres, Directeur de l'Observatoire, Paris-Meudon, France.
Prof. A. S. Eddington, Plumian Professor of Astronomy, University of Cambridge; The Observatory, Cambridge, England.
Prof. Shin Hrrayama, Professor of Astronomy at the University and Director of the Astronomical Observatory, Azabu, Tokyo, Japan.
Prof. Frank Schlesinger, Director of the Yale University Observatory, New Haven, Conn., U.S.A.

GENERAL SECRETARY:
Prof. F. J. M. Stratton, Gonville and Caius College, Cambridge, England.

## REPORT OF THE EXECUTIVE COMMITTEE, 1928

The work of the Union is done between meetings through the various commissions set up by the Union. The reports submitted by the Presidents of these commissions show clearly the value of the work that the Union is supporting in astronomy and indicate the many fresh problems awaiting action on the part of the Union. The report of the Executive Committee is necessarily more concerned with questions of administration and organization.

## Countries Adhering to the Union

Since the last meeting of the Union further progress towards the fulfilment of the desire that the Union should become completely international has been made. Egypt and the Argentine Republic have joined the Union which now numbers 23 members. They are as follows:

| Country |  | Year of Adherence | Adhering Organizations |
| :---: | :---: | :---: | :---: |
| (Argentine Repub |  | 1927 | Government. |
| Australia ... | ... | 1922 | National Research Council. |
| Belgium |  | 1920 | Académie Royale de Belgique, Bruxelles. |
| Brazil |  | 1922 | Government. |
| Canada |  | 1920 | Government. |
| Czecho-Slovakia |  | 1922 | Government. |
| Denmark | $\ldots$ | 1922 | Det Kongelige Danske Videnskabernes Selskab. |
| Egypt | ... | 1925 | Government. |
| France | ... | 1820 | Académie des Sciences. |
| , Great Britain |  | 1920 | Royal Society. |
| Greece | ... | 1920 | Academy of Athens. |
| Holland | ... | 1922 | Nederlandsche Astronomen Club, |
| Italy | ... | 1921 | Consiglio Nazionale di Ricerche. |
| Lapan | ... | 1920 | National Research Council. |
| Mexico |  | 1921 | Government. |
| Norway | ... | 1922 | Videnskabs Selskabet i Kristiania (Oslo). |
| Poland | ... | 1922 | Polska Akademja Umiejętności, Cracovie. |
| Portugal | ... | 1924 | Government. |
| South Africa | ... | 1922 | Government (Dept. of Mines and Industries). |
| Spain | ... | 1922 | Government. |
| Sweden | ... | 1925 | Government. |
| Switzerland | ... | 1923 | Société Helvétique des Sciences Naturelles. |
| Vnited States | ... | 1920 | National Research Council. |

In addition Roumania has expressed sympathy with the objects of the Union though so far it has not been able to take up fyll membership. The Committee hope that the next report may show further additions of considerable importance to the Union in the list of adhering countries.

## Deceased Members

The Executive Committee regret to record the loss by death of the following members of the Union:
Prof. A. Abetti, Past Vice-President, Member of Commission 20. Died February 20, 1928.
Prof. A. M. Antoniazzi, Member of Commissions 7, 20, 3I. Died November 30, 1925.

Prof. V. Cerulli, Vice-President of the Union, Member of Commissions 16, 23. Died May 30, 1927.
Dr J. L. E. Dreyer, Member of Commission 28. Died September 14, 1926.

Prof. W. J. Hussey, Member of Commission 26. Died October 28, 1926.
Dr E. Padova, Member of Commission 27. Died October 3I, 1925.
Prof. A. Perot, Member of Commissions 14, 15. Died November 27, 1925.
Dr H. Philippot, Member of Commissions 8, 18, 31. Died October 13, 1925. Prof. J. F. Schroeter, Member of Commissions 5, 8. Died April 27, 1927.

## New Members

The following were co-opted by the various commissions under Statute 12 and became thereby members of the Union. The numbers of the commissions that they have joined are given in brackets after each name.
A. Alden (24), J. A. Anderson (12), F. E. Baxandall (29), O. Bergstrand (12), S. Chapman (12), P. A. Curry (3I), B. H. Dawson (26), M. H. Janne (19), E. S. King (25), K. Kordylewski (27), J. Krassowski (20), C. O. Lampland (28), B. Lindblad (25, 29), M. R. Madwar (28), Z. A. Merfield (I2), M. Minnaert (I2), J. H. Moore (30), F. Moreau (8, 18, 3I), C. D. Perrine (8), H. C. Plummer (7), J. C. S. Rodrigues (4), and H. E. Wood (20).

A number of members were co-opted on to extra commissions during the year. Changes of this nature, changes of address, resignations from the Union and other minor changes have been notified to all members of the Union in four circulars distributed at intervals during the last three years.

## Extraordinary Meeting of the General Assembly

At the General Assembly at Cambridge on July 2r, r925, the following resolution of the Finance Committee of the Union was adopted (Trans. I.A.U. 2, 218, 1925):
"The Finance Committee recommends that the unit of contribution should be changed to a gold standard with a view of stabilising the income of the Union."

Correspondence on the subject followed with the International Research Council, and on July 19, 1926, the following letter was received from the General Secretary of the International Research Council:

## Dear Sir,

At the recent extraordinary meeting of the General Assembly, attention was drawn by M. Lallemand to the inconvenience which has arisen owing to the great variation in the value of the Franc, which has hitherto served as the basis of the subscriptions.
The Assembly decided that the unit of subscription to the International Research Council shall in future be the gold Franc, but that the amount fixed by Article 19 of the Statutes shall be reduced to some sum intermediate between one-third and one-fifth of the present amount.

It was further decided that this resolution be communicated to the different Unions and that they be asked to take similar steps as regards their own body.

I shall be glad if you will kindly bring this matter to the notice of your Bureau, and inform me in due course of the figure which should in future replace that given in your present Statutes.

Yours sincerely, Arthur Schuster, General Secretary.
N.B. To obtain the value of the gold franc in terms of the currency of any country it is sufficient to divide the dollar exchange of that country by $5^{\circ}$ 18. Thus, if the dollar is quoted as equal to 34 Belgian francs, the ratio $34: 5 \cdot 18=6 \cdot 56$ indicates that six francs fifty-six centimes in Belgian money are equal to one "gold franc."

The President, after consulting the Executive Committee, acting under Statute ri summoned an extraordinary meeting of the General Assembly to meet at Leiden on January 4, 1927. The following letter was sent to all adhering organizations in August, 1926.

Dear Sir,
In accordance with Statute 1 I of the International Astronomical Union the President summons an extraordinary meeting of the General Assembly to be held at the Observatory, Leiden, Holland, on January 4, r927, at 3 p.m., to consider the following proposals:
(a) That the last sentence but one of Statute 14 be altered to read:

The contribution to be levied during the first period of the Convention shall not exceed 500 gold francs per annum per unit. (The footnote in the Statutes will be omitted. $5 \cdot 18$ gold francs are equal to one dollar.)
(b) That the unit of contribution for the years 1927,1928 be fixed at 375 gold francs. (The value of 1500 French francs on the date July 21, 1925, when the unit was fixed for three years, was 367 gold francs.)
(c) That grants made in francs at the General Assembly on July 21, 1925, be altered to gold francs at the rate I gold franc for 4 francs, this change to apply to the three years 1926, 1927, 1928.

As the questions to be voted upon are of an administrative character the votes will be taken by countries in accordance with Statute 16.

I am instructed to enquire the names of any delegate or delegates who will attend the General Assembly on behalf of your national committee and, in the event of your country not sending a delegate, to ask you to forward to the President before the meeting the votes of your country upon questions (a), (b), and (c) above.

The extraordinary meeting has been summoned to carry out resolution 3 of the Finance Committee adopted at the General Assembly of the Union on July 21, 1925, at Cambridge. A recent decision of the International Research Council has now made possible the alteration ( $a$ ) in the Statutes suggested above.

Yours sincerely,

> F. J. M. Stratton,
> General Secretary.

The following report of the General Assembly was circulated to all adhering organizations in a circular of date January 7,1927 , and in accordance with resolution (iii) below, supplementary grants were at once made to those commissions which had received their grants in francs.

## Report of Extraordinary Meeting

An extraordinary meeting of the General Assembly convened by the President with the consent of the Executive Committee was held at the Observatory at Leiden at 3.0 p.m. on Tuesday, January 4, I927, President de Sitter in the chair.

The business for which the meeting was called being purely administrative, most countries forwarded their votes by post in accordance with Statute 17, the only countries represented by delegates being Holland represented by the President and Great Britain represented by the Secretary.

The following resolutions were adopted:
(i) That the last sentence but one of Statute 14 be altered to read:
"La cotisation unitaire perçue pendant la première période de la Convention ne pourra dépasser 500 francs-or annuellement."
or in the English form of the Statutes:
"The contribution to be levied during the first period of the convention shall not exceed 500 gold francs per annum per unit."

The footnote to be replaced by the statement: 5.18 gold francs are equal to one dollar (New York).

There voted for the motion, Australia, Belgium, Canada, Denmark, Egypt, France, Great Britain, Holland, Italy, Japan, Mexico, Portugal, Spain, Sweden, United States ( 49 votes). Poland ( 4 votes) voted for a maximum of 375 gold francs. Brazil, Czecho-Slovakia, Greece, Norway, Roumania, S. Africa, Switzerland (I6 votes) did not vote. The majority of two-thirds votes necessary for a change of Statutes was obtained.
(ii) That the unit of contribution for the years 1927 , 1928 be fixed at 375 gold francs.

This was carried by 53 votes to nil (Poland supporting this motion) with the same countries not voting as before. The United States while agreeing to the proposal expressed the opinion that the amount should have been 500 gold francs.
(iii) That grants made in francs at the General Assembly on July 2I, 1925, be altered to gold francs at the rate of I gold franc for 4 francs; this change to apply to the three years 1926, 1927, 1928.

This was carried by 53 votes to nil, the voting being the same as in (ii). The meeting then adjourned.

## Income and Expenditure

As indicated above the variation in the value of the franc during the years immediately following the Cambridge meeting seriously affected the financial position of the Union and of certain commissions of the Union which had undertaken work for the Union. Their claims for further support were met in accordance with the decision of the Union at Leiden, but the receipts for 1926 and 1927 fell considerably below the expenditure thus authorized for each of the three years 1926, 1927, 1928. Although the decision to alter the unit of subscription was taken in January, 1927, the subscriptions of many countries continued to be paid for 1927 on the old basis. This was necessary because the sum came from government sources; it had been estimated for in financial estimates which had been approved by the proper authorities and it was impossible to obtain supplementary payments.

A balance of $\mathrm{frI}_{72}$ is shown in the accounts on January 1, 1928. Against this have to be placed grants authorized for 1927, 1928 not yet paid, totalling $£ 1347$, while outstanding subscriptions from adhering countries on that date totalled £725. Thus the effective balance on January 1, 1928, was $£ 550$ as against an effective balance on January 1 , 1925, of $£ 1270$. A heavy printing bill will have to be met this year in connection with the forthcoming meeting at Leiden and the publication of Vol. III of the Transactions of the Union. The accounts for the years 1925, 1926, 1927 follow the lines of those of the previous three years.


INCOME AND EXPENDITURE, 1927


## Special Grants

The Executive Committee have been asked on several occasions for financial assistance in connection with astronomical investigations. The following requests were acceded to and the grants were made by the Committee:
(a) Commission 19. A grant of $£$ roo to Dr Gautier, head of the Restricted Geodetic Association, to cover part of the cost of publishing the latitude observations for the years 1914-2I inclusive with the necessary reductions. The following letter in support of this grant was submitted to the Executive Committee by Professor Schlesinger in July, 1926:

The Astronomical Union through its Committee 19 and the Geophysical Union through its Geodetic Section succeed the International Geodetic Association so far as the latitude service is concerned. As you know, this service is conducted under the joint auspices of the two Unions and both have been contributing to the upkeep of the latitude work. These contributions refer to the reductions of current observations, the observations themselves being now provided for by the three countries in which the stations lie, namely, Italy, Japan, and the United States.
Major Bowie, Chief of the Division of Geodesy of our Coast Survey, has put into my hands copies of correspondence between him and Dr Gautier, the latter being at the head of the Restricted Geodetic Association which has been providing for the continuity of the observations and reductions after 1914 when the war cut off most of the support of the old Geodetic Association. The Restricted Association has by one means or another provided all the expenses of reducing theobservations to 1922, when our Unions assumed the responsibility for this work. There still remains, however, the expense of publishing these results, which it is estimated will amount to not less than $\$ 1000$.
It is entirely fitting in my opinion that this expense should be borne by the two Unions, but it is impracticable to ask the Geophysical Union to contribute any substantial amount for this purpose since their funds are much more completely allocated than ours. I therefore propose that the Astronomical Union make an appropriation of $\$ 1000$ for this purpose, with the understanding that this amount may be increased if such an increase is found to be indispensable.
The computation and discussion will not be ready for publication before the end of 1927, but it is desirable that Dr Gautier should know soon whether funds are likely to be forthcoming from this source. If not it will be necessary to find them elsewhere and ample time should be allowed for this purpose. I should therefore be greatly obliged to you if you will take up immediately and at least informally with the other members of the Executive Committee this proposed appropriation. I for one am heartily in favour of it and am of opinion that this is one of the responsibilities the Union tacitly assumed in taking the place of previous international organisations.

It was felt by the Executive Committee that $£$ roo was as large a grant as they ought to make on their own initiative and that it was sufficient to enable the work to be commenced.
(b) Commission 34. A grant of $£ 50$ to the Astronomische Nachrichten for the publication of star corrections to the reference stars to be used in the observations of Eros. The following letter from Sir Frank Dyson was received in January, 1927:

As Chairman of the Eros Committee I should like to make application to the Executive Committee of the I.A.U. to make a grant of $£ 50$ to the Astronomische Nachrichten for the publication of star corrections of the reference stars to be used in the observations of Eros. These are being computed in the Nautical Almanac Office and it was arranged with the $A . N$. to print them. They find this to be a greater expense than they can undertake without some assistance. If the I.A.U. has any available funds, this seems to me an excellent use for them.

## Transactions of the Union

The reports of the Chairmen of Commissions to the Cambridge meeting of the Union in 1925 together with an account of the proceedings at Cambridge were published in Vol. II of the Transactions of the International Astronomical Union.

The present position of the stock of Vols. I and II is as follows. Of Vol. I, there remains 75 bound copies and 200 unbound copies in stock. Of Vol. II there are 40 bound and 200 unbound copies in stock. Copies of Vol. II were distributed to all members of the Union, including new members co-opted since the meeting, and certain copies were issued by the General Secretary for official and other purposes. During the last three years 64 copies of Vol. I were sold and 7 I copies of Vol. in. Vol. III is being published by the Cambridge University Press who now also hold the main stock of the earlier volumes.

## The Meeting at Leiden

An invitation from the Dutch Government to hold the General Assembly at Leiden in 1928 was presented to the Union at Cambridge and unanimously accepted. The date was provisionally fixed for July 5, 1928, and communicated to all members in a circular dated July II, 1927. The following letter was addressed to all Presidents of Commissions on July 16, 1927:

The date which has been provisionally fixed for the opening of the Conference of the International Astronomical Union at Leiden is July 5, 1928.

In accordance with the Statutes of the Union (Art. 13) the agenda of the business to be transacted at the meeting must be communicated to the adhering organisations at least four months before the first day of the meeting, and National Committees have therefore been requested to forward to the Bureau of the Union a statement of the questions, which they desire to have discussed at Leiden, not later than the end of 1927.

The President and General Secretary suggest that Presidents of Commissions should circulate draft reports and recommendations to members of their Commissions in time to allow the final reports to be forwarded to the General Secretary for printing not later than the end of February, 1928.

In order to assist the Executive Committee of the Union in the preparation of the budget for each of the three years immediately succeeding the Leiden Conference (Statutes, Art. 14), Presidents of Commissions occupied with work that calls for contributions from the funds of the Union are also requested to submit estimates of the sums required as early as possible in 1928.

The following letter was also sent to all adhering organizations on July 18, 1927:
On behalf of the Executive Committee, 1 have the honour to inform you that arrangements have been made to hold the next General Assembly of the International Astronomical Union at Leiden, Holland, commencing July 5, 1928.

I shall be glad if you will be good enough to direct the attention of your National Committee for Astronomy to the regulation that the agenda of business to be transacted must be communicated to the adhering organisations at least four months before the first day of the Meeting (Statute 13). Any proposals to be put on the agenda should, accordingly, be communicated to the Executive Committee not later than the end of 1927.

The resolutions received from the different countries by December 3r were notified to all adhering countries in a circular sent to all adhering organizations in January, 1928. They are given below in the Agenda for the General Assembly. With regard to the amendment of the Statutes proposed by Great Britain and the United States, the Executive Committee wish to point out that this is merely
inserting in the Statutes of the Union a change made possible by the International Research Council at Brussels in 1922 at the specific request of the Union (see Trans. I.A.U. 2, Io, 1925). The consequent need of change in the Statutes of the Union was overlooked at Cambridge in 1925. The President has, however, felt confident of the cordial support of the Union and has anticipated the passing of the proposed amendment of the Statutes by inviting to the Leiden meeting scientific men of countries not yet adhering to the International Research Council though entitled to adhere to it.

A Local Committee with Dr Hins as Secretary was constituted at Leiden early in 1928 and a provisional programme of arrangements for the Leiden meeting has been communicated to all members, delegates and visitors invited by the President.

## Procedure at the Meeting

The precedent of the meetings at Rome and Cambridge will be followed. The opening meetings of the General Assembly will be followed by meetings of commissions for the discussion of the draft reports and recommendations. At the end of the meeting the General Assembly will meet again to accept reports of commissions, to vote upon recommendations, to appoint standing commissions to act until the next meeting of the General Assembly, to appoint the Executive Committee and to arrange the date and place of the next meeting.

The Executive Committee propose that the Finance Committee, appointed at the first meeting of the General Assembly, shall consist as before of one member of each adhering country, nominated by the delegates of that country. The Executive Committee will also ask the General Assembly to appoint a Committee to assist them in drawing up the lists of standing commissions for the next period. In view of the fact that the present Convention governing the Union ends on December 3I, 193I, and that the International Research Council is considering changes in its Statutes, the Executive Committee will ask the General Assembly at their first meeting to appoint a committee to report at the last meeting of the General Assembly on the present Statutes of the Union and on any desirable changes in the Statutes.

The Executive Committee will nominate chairmen for the meeting for those commissions whose Presidents cannot attend the Leiden meeting. They will also submit to the General Assembly a name for a Vice-President for the meeting in the place of the late Professor V. Cerulli. With regard to the Executive Committee to be appointed at Leiden, it should be noted that the present terms of office of Dr Deslandres and Professor S. Hirayama expire at the close of the Leiden meeting.

As to the date and place of the next meeting it is to be noted that at the meeting at Prague in September, 1927, of the International Geodetic and Geophysical Union, a motion was passed inviting co-operation between the two Unions in the matter of arranging their meetings, so that they might be held in the same year at an interval of only a few weeks and in cities not too distant from each other so as to facilitate attendance at these meetings by scientific men interested in the work of both Unions. It is understood that the International Geodetic and Geophysical Union will meet next in 1930 in Scandinavia. The Executive Committee feel that two years is too short an interval between meetings of the Astronomical Union, and they are of the opinion that the next General Assembly should be fixed for 193I or 1932. They recognize that changes of statutes may be necessary before 1932, but hope that any necessary changes can be carried out by a postal vote and a small meeting such as was held at Leiden in January, 1927.

## Agenda for General Assembly

I. Address by the President of the Union.
2. Appointment of Vice-President for the meeting.
3. Appointment of Recorders for the meeting.
4. Report of the Executive Committee.
5. Appointment of Finance Committee.
6. Appointment of Committee on the Statutes of the Union.
7. Appointment of Committee to assist in choosing the Commissions of the Union.
8. Discussion of proposals submitted to the General Assembly by National Committees:
(a) Amendment of Statutes:
V. I2. That after "provided they are subjects of one of the adhering countries" the words " or of a country entitled to adhere" be added. (Great Britain and United States.) (See p. 299.)
(b) Terminology as to time:

That terminology as to time and the commencement of the day be standardized. (Poland.)
(c) That "Greenwich mean astronomical time" and "Greenwich mean civil time" be used for time reckoned from Greenwich mean noon and mean midnight respectively and that such terms as Weltzeit, Universal time, etc. be abandoned. (Holland.) (See p. 300.)
(d) That the adoption of a new unit of stellar distance be discussed and a new definition of absolute magnitude. (Belgium.) (See p. 223.)
(e) That a notation be adopted for the different types of variable stars and for meteor showers. (Belgium.) (See pp. 246, 249.)
$(f)$ That a rational system of fixing the boundaries of constellations, based upon arcs of hour circles and parallels of declination, be adopted: and that an atlas be published under the auspices of the I.A.U. from $+90^{\circ}$ to $-12 .^{\circ} 5$ in Declination with all stars down to magnitude $6 \cdot 5$. (Belgium.) (See p. 299.)
$(g)$ That in any mathematical definition of the boundaries of constellations the Union should co-operate with the committee of the Astronomische Gesellschaft charged with the naming of variable stars. (United States.) (See p. 299.)
( $h$ ) That the division of the nonagesimal degree be generally employed. (Belgium.)
(i) That a detailed list of observatories and astronomers should be published periodically under the auspices of the I.A.U. (Belgium.) (See p. 30r.)
(j) That steps be taken to facilitate the cataloguing of astronomical publications in the libraries of observatories. (Poland.)
$(k)$ That all meridian work be published at as early a date as possible. (United States.)
(l) That the I.A.U. should urge the establishment of additional observations of latitude variation in the southern hemisphere, and that the importance of this work be brought to the attention of those agencies that are in a position to foster it. (United States.) (See p. 304.)
( $m$ ) That the parallaxes of all clusters known to be globular be determined by means of the periods of Cepheid variables or the mean apparent magnitude of the 25 brightest stars occurring in each cluster. (These data together with a determi-
nation of the diameter of the cluster will furnish a value for the absorption of light in space with a probable error of $0 \cdot{ }^{\prime \prime} 40$ per roo,000 parsecs.) (Holland.) (See p. 250.)
$(n)$ That the Union considers the question of international loans of instruments and of a pied à terre for astronomers for carrying through their scientific work. (Poland.)

An additional resolution was received from France too late for inclusion in the list circulated to all countries in advance. Under Statute I3 this may be discussed if the Assembly, voting by countries, agrees by a majority vote.
(o) That an agreed value of the mean solar rotation be adopted for all synoptic maps of the Sun, also an agreed zero point from which to measure the rotation. (See p. 302.)

Meetings of Standing Commissions for discussion of Reports and Recommendations.

First meetings of Commissions have been arranged as follows:

Friday afternoon
Room A 14.00 Commission 8
I5.00 Commission 23
" B 14.00 Commission 16
" C 15.00 Commission 24
,, D 14.00 Commission 25 15.00 Commission 26

E 14.00 Commission 12

Saturday morning
Room A ro.00 Commission 20
,, B 10.00 Commission 31 II.00 Commission 18

C 10.00 Commission 30 II.oo Commission 29

D 10.00 Commission 14
II.00 Commission 34

E 10.00 Commission 27

Monday morning

| Room A | 10.00 | Commission 5 | Room | C 10.00 | Commission 7 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 11.00 | Commission 3 |  | II.00 | Commission 6 |
|  | 12.00 | Commission 17 |  | 12.00 | Commission 4 |
| B | 10.00 | Commission 19 | , D | D 10.00 | Commission 15 |
|  | 11.00 | Commission 33 |  | 11.00 | Commission 28 |
|  | 12.00 | Commission 22 |  | 12.00 | Commission 9 |

Agenda for General Assembly at Close of Meeting
I. Report of Finance Committee.
2. Reports of Standing Commissions.
3. Report of Committee on Statutes.
4. Appointment of Standing Commissions.
5. Appointment of Executive Committee.
6. Date and place of next meeting.

