Bulletin nº 135 Novembre-Décembre 1962

U. R. S. I.

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Programme Scientifique

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Les Présidents des Commissions III et V ont fait connaître au Secrétaire Général les noms des personnalités qui présenteront les communications introductives aux séances scientifiques de leurs Commissions :

Commission III :

1. Radiation ionisante et constitution de l'atmosphère — H. FRIEDMAN.
2. Géomagnétisme et ionosphère — C. O. HINES.
3. Ondes dirigées dans la troposphère et l'ionosphère (séance mixte avec les Commissions II et IV) — K. G. BUDDEN.
4. Radioélectricité, ionosphère et l'Année Internationale du Soleil Calme — W. J. G. BEYNON.
5. Distribution des électrons dans l'ionosphère (séance mixte avec la Commission IV) — R. KNECHT.

Commission V :

1. Techniques et mesures observationnelles — E. J. BLUM.
2. Radioastronomie solaire (Soleil calme) — W. N. CHRISTIANSEN.
3. Radioastronomie solaire (Soleil actif) — T. HATANAKA.
4. Radioastronomie de la Galaxie — G. WESTERHOUT.
5. Radioastronomie des sources discrètes — R. Hanbury BROWN.
6. Radioastronomie du système solaire — F. HADDOCK.

XIVth GENERAL ASSEMBLY

Scientific Programme

The Chairmen of Commission III and of Commission V have informed the Secretary General of the names of the introductory speakers for each of the scientific sessions of their Commission :

Commission III :

1. Ionising radiations and atmospheric constitution — H. FRIEDMAN.
2. Geomagnetism and the ionosphere — C. O. HINES.
3. Guided waves in the troposphere and ionosphere (joint session with Commissions II and IV) — K. G. BUDDEN.
4. Radio, the ionosphere and I.Q.S.Y. — W. J. G. BEYNON.
5. Electron distribution throughout the ionosphere (joint with IV) — R. KNECHT.

Commission V :

1. Observational techniques — E. J. BLUM.
2. Solar radio astronomy (quiet sun) — W. N. CHRISTIANSEN.
3. Solar radio astronomy (active sun) — T. HATANAKA.
4. Radio astronomy of the Galaxy — G. WESTERHOUT.
5. Radio astronomy of the discrete sources — R. Hanbury BROWN.
6. Radio astronomy of the solar system — F. HADDOCK.

Lettre du Secrétaire Général

See English text p. 8

Aux : Présidents d'Honneur,
Membres du Bureau,
Présidents des Comités Nationaux,
Présidents des Commissions et des Comités.

XIV^{e} ASSEMBLÉE GÉNÉRALE

Cher Collègue,

L'article 31 des Statuts de l'Union stipule que l'ordre du jour de l'Assemblée Générale est établi par le Secrétaire Général sur

proposition du Bureau, du Comité Exécutif, des Comités Nationaux et des Commissions.

Par ailleurs, l'article 14 du Règlement Intérieur énumère les points qui, en principe, peuvent faire l'objet de propositions à l'Assemblée Générale de la part du Comité Exécutif. Parmi ceux-ci figurent les propositions de modifications aux Statuts et au Règlement Intérieur de l'Union.

Il est évident que pour que de telles propositions de modifications puissent aboutir à des résultats cohérents, les membres du Comité Exécutif doivent avoir le temps de les étudier et de consulter les Comités Nationaux qu'ils représentent. Dans ce but j'ai été invité à faire parvenir aux membres du Comité Exécutif le Rapport du Secrétaire Général au plus tard le 1er juin 1963.

J'attire aussi votre attention sur le fait que les questions ne figurant pas à l'ordre du jour de l'Assemblée Générale ne seront prises en considération qu'avec l'assentiment préalable de la moitié au moins des voix attribuées aux pays représentés à l'Assemblée Générale (art. 31 des Statuts).

Afin de me permettre de prendre les dispositions nécessaires en temps voulu, je vous saurais gré de me faire parvenir :

1. *au plus tard pour le* 15 *février* 1963, vos propositions de modifications aux Statuts et au Règlement Intérieur de l'U.R.S.I. ;
2. *au plus tard pour le* 31 *mars* 1963, tout point que vous désireriez voir figurer à l'ordre du jour du Comité Exécutif ou de l'Assemblée Générale.

Je tiens à attirer votre attention sur les points suivants qui, conformément à l'article 14 du Règlement Intérieur, figureront à l'ordre du jour du Comité Exécutif et de l'Assemblée Générale :

a) Propositions pour l'élection des Membres du Bureau, des Présidents des Commissions et des Comités, ainsi que des représentants de l'Union au sein d'autres organismes scientifiques.

(i) Conformément à l'article 11 des Statuts, les Membres du Bureau élus entrent en fonction après l'Assemblée Générale qui a prononcé leur élection et ils y restent jusqu'à la fin de l'Assemblée Générale ordinaire suivante. Ils sont immédiatement rééligibles, mais le Président ne doit pas normalement rester en fonction pendant deux termes consécutifs, et les Vice-Présidents ne doivent

pas normalement rester en fonction plus de deux termes consécutifs.

Le Prof. I. Koga et le Prof. G. A. Woonton auront assumé leurs fonctions de Vice-Président pendant deux termes.

(ii) Conformément à l'article 8 des Statuts, les Présidents de Commission entrent en fonction après l'Assemblée Générale qui a prononcé leur élection et ils y restent jusqu'à la fin de l'Assemblée Générale ordinaire suivante. Ils sont immédiatement rééligibles mais, normalement, ils ne doivent pas rester en fonction pendant plus de deux termes consécutifs.

Les Présidents des Commissions sont invités à proposer au Comité Exécutif des candidats dont la désignation aura été approuvée au préalable par les Membres Officiels de la Commission intéressée.

Ceci s'applique également aux Présidents qui sont rééligibles.

Les Présidents de Commission actuellement en fonctions sont les suivants (entre parenthèses la date de leur élection) :

Commission I : Mesures et Etalons Radioélectriques — Prof. U. Adelsberger (1960).

Commission II : Radioélectricité et Troposphère — M. J. Voge (1960).

Commission III : Radioélectricité Ionosphérique — M. J. A. Ratcliffe (1960).

Commission IV : Bruit Radioélectrique d'Origine Terrestre — Prof. R. A. Helliwell (1957).

Commission V : Radioastronomie — Prof. A. C. B. Lovell (1957).

Commission VI : Ondes et Circuits Radioélectriques — M. J. Loeb (1960).

Commission VII : Radioélectronique — Prof. W. G. Shepherd (1957).

b) Date et lieu de l'Assemblée Générale suivante (XV^{e}).

c) Montant de l'unité contributive annuelle qui est à verser par les Comités Nationaux conformément au barème établi dans l'article 26 des Statuts (voir ma lettre n^{o} 200/4320 du 10 mai 1962, adressée aux Comités Nationaux et suggérant que l'unité contributive annuelle passe de $ 125 à $ 150).

d) Reconnaissance de nouveaux Comités Nationaux.

e) Création de nouvelles Commissions et de nouveaux Comités.

f) Programmes de travail, résolutions et recommandations présentés par les Commissions de l'Union.

g) Approbation des comptes et budgets de l'Union.

h) Modifications aux Statuts et au Règlement Intérieur de l'Union.

(i) Toutes recommandations concernant les activités de l'Union, de ses Commissions et des Commissions Mixtes pour lesquelles l'Union a été désignée comme Union-Mère par le Conseil International des Unions Scientifiques.

Ce dernier point englobe les modifications à l'appellation et aux mandats des Commissions et Comités existants.

En outre, je saurais gré aux Comités Nationaux de me faire connaître :

(i) *avant le* 15 *janvier* 1963, les noms des délégués qui assisteront à l'Assemblée Générale (dans le but d'aider le Comité Organisateur à assurer le logement).

(ii) *avant le* 31 *mars* 1963, les noms :

1. des délégués au Comité Exécutif (un par Comité National ; article 15 des Statuts),
2. des délégués officiels à l'Assemblée Générale et dont le nombre varie suivant la catégorie à laquelle le Comité National adhère à l'U.R.S.I. (article 26 des Statuts).

En vous remerciant de l'attention que vous voudrez bien accorder à la présente lettre, je vous prie d'agréer l'expression de mes sentiments distingués.

1er décembre 1962.

Le Secrétaire Général,
(*s*) E. Herbays.

Letter from the Secretary General

To : Honorary Presidents,
Officers of the Board,
Presidents of National Committees,
Commission and Committee Chairmen.

XIVth General Assembly

Dear Colleague,

Article 31 of the Statutes of U.R.S.I. provides that the Agenda of the General Assembly is drawn up by the Secretary General on the proposals of the Board of Officers, of the Executive Committee, of the National Committees and of the Commissions.

On the other hand, art. 14 of the Bylaws mentions the items on which, in principle, proposals may be submitted by the Executive Committee to the General Assembly. Among such items are proposals for modifications to the Statutes or to the Bylaws.

It is obvious that, if such proposals for modifications have to reach coherent results, members of the Executive Committee should have time to study them and to consult National Committees which they represent. At this end, I have been instructed to send to the members of the Executive Committee the Report of the Secretary General at the latest on June 1st, 1963.

I wish also to draw your attention to the fact that matters no appearing on the agenda of the General Assembly will be considered only if prior approval is given by not less than half of the votes allocated to countries represented at the General Assembly (art. 31).

In order to be able to take the necessary steps in due time I would appreciate to be informed :

1. *at the latest on February 15th*, 1963 of your proposals for modifications to the Statutes and Bylaws of U.R.S.I.
2. *at the latest on March 31st*, 1963 of any items you should wish to have on the agenda of the Executive Committee or of the General Assembly.

I call your attention to the following items which in accordance

with art. 14 of the Bylaws will be on the agenda of the Executive Committee and of the General Assembly :

a) Nominations for the Officers of the Union, Chairmen of Commissions and Committees and representatives of the Union in other scientific organizations.

(i) According to art. 11 of the Statutes the Officers of the Board are elected to hold office from the end of the General Assembly at which they are elected until the end of the following ordinary General Assembly. They are eligible for immediate re-election, except that the President may not normally serve two consecutive terms, and the Vice-Presidents may not normally serve more than two consecutive terms.

Prof. I. Koga and Prof. G. A. Woonton will have held office for two terms.

(ii) According to art. 8 of the Statutes, Chairmen of Commissions assume their duties after the General Assembly at which they have been elected and retain them until the end of the following ordinary General Assembly. They are eligible for immediate re-election, but normally they may not serve more than two consecutive terms.

Commission Chairmen are asked to propose nominees to the Executive Committee after approval of the nomination by the Official Members of the respective Commission.

This is also valid for Chairmen who are re-eligible.

The Commission Chairmen are the following (in brackets date of their election) :

Commission I : On Radio Measurements and Standards — Prof. U. ADELSBERGER (1960).

Commission II : On Radio and Troposphere — Mr. J. VOGE (1960).

Commission III : On Ionospheric Radio — Mr. J. A. RATCLIFFE (1960).

Commission IV : On Radio Noise of Terrestrial Origin — Prof. R. A. HELLIWELL (1957).

Commission V : On Radio Astronomy — Prof. A. C. B. LOVELL (1957).

Commission VI : On Radio Waves and Circuits — Mr. J. Loeb (1960).

Commission VI : On Radio Electronics — Prof. W. G. Shepherd (1957).

(*b*) Date and place of the next (XVth) General Assembly.

(*c*) Amount of the annual unit of suscription to be paid by the National Committees in accordance with the scale laid down in art. 26 of the Statutes (See my letter n^{r} 200/4320 of May 10th, 1962 to National Committees suggesting to increase the annual unit from $ 125 to $ 150).

(*d*) Recognition of new National Committees.

(*e*) Creation of new Commissions and Committees.

(*f*) Programmes of work, resolutions and recommendations submitted by the Commissions of the Union.

(*g*) Approval of the account and budgets of the Union.

(*h*) Modifications to the Statutes or to the Bylaws of the Union.

(*i*) Any recommendations concerning the activities of the Union, of its Commissions and of Joint Commissions of which the Union has been designated as Parent Union by the International Council of Scientific Unions.

This last item should include modifications to the names and terms of reference of the existing Commissions and Committees.

Moreover I would be thankful to the *National Committees* to be informed :

(i) *before January* 15 *th*, 1963 of the names of delegates expected to attend the General Assembly (this to help the General Arrangements Committee to take the necessary steps to secure accommodation) ;

(ii) *before Marsh* 31*st*, 1963 of the names :

1. of the délegates to the Executive Committee (one for each National Committee — art. 15 of the Statutes) ;
2. of the official delegates to the General Assembly ; the number of such delegates varies according to the category in which the National Committee adheres to U.R.S.I. (art. 26 of the Statutes).

In thanking you for the consideration you will give to this letter,

December 1st, 1962.

I remain, Yours sincerely
(*sgd*) E. Herbays,
Secretary General.

Calendrier

15 janvier : Les Comités Nationaux sont invités à faire connaître au Secrétaire Général et au Comité Organisateur les noms des participants à l'Assemblée Générale.

15 février : Les Membres du Bureau, les Comités Nationaux et les Présidents de Commission et Comités sont invités à faire parvenir au Secrétaire Général leurs propositions de modification aux Statuts et au Règlement intérieur de l'Union.

31 mars :

(i) Les Membres du Bureau, les Comités Nationaux et les Présidents de Commission et de Comité sont invités à informer le Secrétaire Général de tout point qu'ils désireraient voir inscrit à l'ordre du jour soit du Comité Exécutif, soit de l'Assemblée Générale.

(ii) Les Comités Nationaux sont invités à faire connaître au Secrétaire Général les noms de leur délégué au Comité Exécutif et des délégués officiels à l'Assemblée Générale.

1er mai : Date limite de la réception des rapports des Comités Nationaux (en trois exemplaires).

1er juillet : Date limite de la réception des rapports (deux exemplaires) des Présidents des Commissions.

Date limite de la réception, par le Secrétaire Général, des communications introductives (en deux exemplaires) aux séances scientifiques.

Calendar

January 15 : National Committees are invited to inform the Secretary General and the General Arrangements Committee of the names of participants to the General Assembly.

February 15 : Officers of the Board, National Committees and Commission and Committee Chairmen are invited to send to the Secretary General their proposals for modification to the Statutes and Bylaws.

March 31 :

(i) Officers of the Board, National Committees and Commission and Committee Chairmen are invited to inform the Secretary General of any items they would wish to have on the agenda of the Executive Committee or of the General Assembly.

(ii) National Committees are invited to send to the Secretary General the names of the delegate to the Executive Committee and of the Official delegates to the General Assembly.

May 1 : National Committee Reports (three copies) should reach the Secretary General for this date.

July 1 : Commission Chairmen are invited to send their Reports (two copies) to the Secretary General for this date.

Authors of reviews are invited to send their Reports (two copies) to the Secretary General for this date.

COMITÉS NATIONAUX

Belgique

Liste des membres effectifs du Comité National

M. P. Baudoux, avenue Armand Huysmans, 86, Bruxelles 5,

M. Vitold Belevitch, boulevard Général Jacques, 34, Bruxelles 5.

M. Charles, Ecole Royale Militaire, Laboratoire des Télécommunications, 30, avenue de la Renaissance, Bruxelles 4.

M. J. Cnops, Vaderlandstraat, 30, Gand.

M. M. Cogneaux, avenue Princesse Paola, Saint Symphorien, Hainaut.

M. R. Coutrez, 6, rue Louis Hymans, Bruxelles 6.

M. F. Dacos, rue des Vennes, 174, Liège.

M. A. Dorsimont, Ecole Royale Militaire, Laboratoire des Télécommunications, 30, avenue de la Renaissance, Bruxelles 4.

M. Ed. Gillon, avenue Léopold III, 43, Héverlé-Louvain.

M. E. Lahaye, 44, avenue du Pesage, Bruxelles 5.

M. Ch. Manneback, Secrétaire Perpétuel de l'Académie Royale de Belgique, rue de la Tourelle, 27, Bruxelles 4.

M. J. Marique, avenue Prince d'Orange, 97, Bruxelles 18.

M. M. Nicolet, avenue Den Doorn, 30, Bruxelles 18.

M. P. Hontoy, Laboratoire de Radioélectricité, Université Libre de Bruxelles, 50, avenue Franklin Roosevelt, Bruxelles 5.

Liste des membres associés

M. R. Pastiels, avenue Bel Air, 123, Bruxelles 18.

M. M. Bossy, Institut Royal Météorologique, 1, avenue Circulaire, Bruxelles 18.

M. Maenhoudt, Institut Royal Météorologique, 1, avenue Circulaire, Bruxelles 18.

M. GONZE, Observatoire Royal de Belgique, avenue Circulaire, Bruxelles 18.

M. BEAUFAYS, Service d'Electricité, Institut de Physique, Université Libre de Bruxelles, 50, avenue Franklin Roosevelt, Bruxelles.

M. JESPERS, 47, avenue A. Huysmans, Bruxelles.

Czechoslovakia

BIBLIOGRAPHY

The Institute of Radio Engineering and Electronics of the Czechoslovak Academy of Sciences has plublished the following papers :

« Deviations from the Rayleigh distribution for a small and for a random number of interfering waves », by Dr. P. BECKMANN, and

« The amplitude-probability distribution of atmospheric radio noise », by Dr. P. BECKMANN.

U. S. A.

LIST OF CHAIRMEN OF NATIONAL COMMISSIONS

Commission I : Radio Measurement Methods and Standards.

Prof. Arthur OLINER, Microwave Research Institute, Polytechnic Institute of Brooklyn, 55, Johnson Street, Brooklyn 1, N. Y.

Commission II : Radio Propagation in Non-Ionized Media.

Prof. Alan T. WATERMAN, Jr., Electronics Laboratories, Stanford University, Stanford, California.

Commission III : Ionospheric Radio.

Dr. C. Gordon LITTLE (code 87.00), National Bureau of Standards, Boulder, Colorado.

Commission IV : Magnetospheric Radio.

Prof. Henry G. Booker, School of Electrical Engineering, Cornell University, Ithaca, New York.

Commission V : Radio and Radar Astronomy.

Prof. A. Edward Lilley, Harvard College Observatory, Cambridge 39, Massachussetts.

Commission VI : Radio Waves and Circuits.

Prof. Lofti A. Zadeh, Dept. of Electrical Engeneering, University of California, Berkeley 4, California.

Commission VII : Radio Electronics.

Prof. Marvin Chodorow, Physics Department, Stanford University, Stanford, California.

NBS REPORTS

The Radio Systems Division, Boulder Laboratories, has issued the « Quarterly Progress Report, nº 5, July-September 1962 ».

COMMISSIONS ET COMITÉS

Listes des Membres Officiels des Commissions
Lists of Commission Official Members

COMMISSION I

Mesures et Etalons Radioélectriques

Président : Prof. U. ADELSBERGER, Physikalisch-Technische Bundesanstalt, Bundesallee 100, Braunschweig, Allemagne.

Vice-Président : M. W. D. GEORGE, Chief, High Frequency Section, Radio Standards Division, National Bureau of Standards, Boulder, Col., U. S. A.

Secrétaires :

M. F. WERTHEIMER, Maître de Conférence à la Faculté des Sciences de Lille, 50, rue Gauthier de Chatillon, Lille, Nord, France.

Dr. E. WEBER, Président, Polytechnic Institute of Brooklyn, 333, Jay Street, Brooklyn, N. Y., U. S. A.

Rédacteur Scientifique : M. B. DECAUX, Ingénieur en Chef, Laboratoire National de Radioélectricité, 196, rue de Paris, Bagneux, Seine, France.

Membres :

Allemagne : Prof. U. ADELSBERGER.

Australie : M. F. J. LEHANY, Chief, C.S.I.R.O. Division of Applied Physics, University Grounds, Sydney, N. S. W.

Autriche : Prof. Dr. J. FUCHS, Director of the University Observatory, Universitätstrasse, 4, Innsbruck.

Belgique : Prof. F. DACOS, 174, rue des Vennes, Liège.

Canada : Dr. J. T. HENDERSON, Division of Applied Physics, National Research Council, Ottawa 2, Ontario.

Danemark : Prof. J. O. NIELSEN, Teleteknisk Forkningslaboratorium, Aagade 145, Trappe 11[8], Copenhagen.

Espagne : Ing. J. Rodriguez-Navarra de Fuentes, Istituto Geografico y Cadastral, Calle del General Ibanez de Ibero, 3, Madrid.

Etats-Unis : Mr. R. W. Beatty, National Bureau of Standards, Boulder, Colorado.

Finlande : Prof. L. Simons, Universitetes Fysikaliska Institut, Siltavuorenpenger, 20, Helsinki.

France : M. P. Abadie, 2, rue des Roses, Fontenay-aux-Roses Seine.

Grèce :

Inde : Dr. K. H. Mathur, Head of the Division of Weights and Measures, Deputy Director, National Physical Laboratory, Hillside Road, New Delhi 2.

Italie : Prof. U. Tiberio, Facolta di Ingegneria, Universita, Via Diotimalvi, Pisa.

Japon : Prof. I. Koga, Vice-president, U.R.S.I., 254, 8-Chome, Kami Meguro, Tokyo.

Maroc : M. Arzelies, Professeur à la Faculté des Sciences, avenue Biarnay, Rabat.

Norvège : Ing. H. Dahl, Christian Michelsens Institutt, Department of Applied Physics, Bigärdagatan, 114, Bergen.

Nouvelle Zélande : Mr. J. G. Burtt, Secretary, Radio Research Committee, Dominion Physical Laboratory, Private Bag, Lower Hutt.

Pérou : c/o Dr. A. Giesecke, Jr., Instituto Geofisico de Huancayo, Ministerio de Fomento, Apartado, 3747, Lima.

Pays-Bas : Ir. L. M. R. Vos de Wael, Laan van Oostenburg, 49, Voorburg.

Pologne : Dr. Stanislaw Ryzko, Professeur à l'Université Technique de Varsovie.

Portugal :

Royaume Uni : Dr. L. Essen, National Physical Laboratory, Teddington, Middlesex.

Suède : Mr. P. O. LUNDBOM, Head of Division, Research Institute of National Defence, Dept. 3, Stockholm 80.

Suisse : Prof. Dr. H. KONIG, Directeur du Bureau Fédéral Suisse des Poids et Mesures, Wildstrasse 3, Berne.

Tchécoslovaquie : Ing. J. TOLMAN, Institute of Radio Engineering and Electronics, Czechoslovak Academy of Sciences, Prague.

République Sud-Africaine : Mr. F. HEWITT, Director, Telecommunications Laboratory of the C.S.I.R.O., P.O.B. 10.319, Johannesburg, Tvl.

U. R. S. S. : M. E. ZHABOTINSKI, Candidat en Sciences Physiques et Mathématiques, c/o Académie des Sciences, Moscou.

Yougoslavie : Dipl. Ing. D. KOVACEVIC, Institute Mihailo Pupin, P.O.B. 906, Belgrade.

COMMISSION II

Radioélectricité et Troposphère

Président : M. J. VOGE, Ingénieur en Chef des Télécommunications, Direction du CNET, 3, avenue de la République, Issy-les-Moulineaux, Seine, France.

Vice-Président : Dr. J. B. SMYTH, Smyth Research Associated, 3555, Aero Court, San Diego 4, Calif., U. S. A.

Secrétaires :

M. F. DU CASTEL, CNET, 3, avenue de la République, Issy-les-Moulineaux, Seine, France.

Dr. J. A. SAXTON, Radio Research Station, Ditton Park, Slough, Bucks, United Kingdom.

Rédacteur Scientifique : Dr. J. A. SAXTON.

Membres :

Allemagne : Dr. J. F. K. GROSSKOPF, Fernmeldetechnisches Zentralamt, Rheinstrasse, 110, Darmstadt.

Australie : Mr. M. L. HARRIS, B. M. G. Research Laboratories, 59, Collins St., Melbourne, Victoria.

Autriche : Dipl. Ing. ANTON, Post- und Telegraphendirektion für Oberösterreich und Salzburg, Linz, Hümerstrasse 4.

Belgique : M. J. MARIQUE, Secrétaire Général du C.C.R.M., 97, avenue du Prince d'Orange, Bruxelles 18.

Canada : Dr. D. R. HAY, Physics Department, University of Western Ontario, London, Ontario.

Danemark : Prof. O. NIELSEN, Teleteknisk Forkningslaboratorium, Aagade 154, Trappe 11[8], Copenhagen K.

Espagne : Prof. F. MORAN SAMMANIEGO, Faculté des Sciences de l'Université de Madrid.

Etats-Unis : Mr. I. H. GERKS, Collins Radio Co., Cedar Rapids, Iowa.

Finlande : Prof. V. VÄISÄLA, The Finnish Academy of Sciences and Letters, Mântytie, 5A, Helsinki.

France : M. J. VOGE.

Grèce : M. L. CARAPIPERIS, 89, rue Patission, Athènes.

Inde : Dr. M. B. SARWATE, Adviser, Wireless Planning and Coordination, Ministry of Communications, Government of India, New Delhi.

Italie : Prof. G. LATMIRAL, Istituto Superiore Navale, Via Amm. Acton, 38, Naples.

Japon : Dr. H. HATAKEYAMA, Director, Tokyo Meteorological Observatory, Ootomachi, Chyoda-ku.

Maroc : M. MONTJOIN, Ingénieur en Chef des Télécommunications, Ministère des PTT, Rabat.

Norvège : M. B. LANDMARK, Norwegian Defence Research Establishment, Kjeller near Oslo.

Nouvelle Zélande : Mr. J. G. BURTT, Secretary, Radio Research Committee, Dominion Physical Laboratory, Private Bag, Lower Hutt.

Pays-Bas : Dr. A. HAUER, Koninklijk Nederlands Meteorologisch Institut, de Bilt, Utrechtseweg 421.

Pologne : Prof. Stefan MANCZARSKI, Directeur du Laboratoire Géophysique de l'Académie Polonaise des Sciences, Varsovie, Palac Kultury i Nauki.

République Sud-Africaine : Mr. F. J. HEWITT, Director, Telecommunications Laboratory of C.S.I.R., POB 10.319, Johannesburg, Tvl.

Royaume Uni : Dr. R. L. SMITH-ROSE, 21, Tumblewood Road, Banstead, Surrey.

Suède : Dr. B. JOSEPHSON, Head of Division, Research Institute of National Defence, Dep. 3, Stockholm 80.

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U. R. S. S. : M. A. I. KALININ.

Yougoslavie : Dipl. Ing. Z. DABIC, Institute Boris Kidric, Vinca.

COMMISSION III

On Ionospheric Radio

Chairman : Mr. J. A. RATCLIFFE, Radio Research Station, Ditton Park, Slough, Bucks, United Kingdom.

Vice-Chairman : Dr. L. V. BERKNER, Graduate Research Center, POB 8478, Dallas, 5, Texas, U. S. A.

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Belgium : M. M. NICOLET, Chef du Service du Rayonnement, Institut Météorologique Royal, 3, avenue Circulaire, Bruxelles 18.

Canada : Dr. J. H. CHAPMAN, Defence Research Telecommunication Laboratory, Defence Research Board, Ottawa, Ont.

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Commission I
Mesures et Etalons Radioélectriques

TEMPS UNIFORME ET FREQUENCE CONSTANTE POUR L'ANNEE 1963

Communiqué du Bureau International de l'Heure, le 29 novembre 1962

D'après les décisions de la Commission Internationale de l'Heure de l'U.A.I., à Berkeley, en août 1961, de l'Assemblée Générale de l'Union Radio Scientifique Internationale (U.R.S.I.) à Londres,

en septembre 1960 et de la Commission d'études n° VII du C.C.I.R. à Genève en avril - mai 1962, le Bureau International de l'Heure, après avoir consulté les Observatoires possédant des résonateurs atomiques à césium et comparé leurs observations astronomiques, a calculé la valeur nominale pour la fréquence à transmettre durant l'année 1963.

$$-130 \times 10^{-10}$$

par rapport à une échelle de temps telle que la fréquence du césium y ait la valeur :

$$f\,(\mathrm{Cs}) = 9\,192\,631\,770\ \mathrm{Hz}$$

La valeur indiquée ne changera pas au cours de l'année 1963. Cette valeur est la même qu'en 1962.

La Commission Internationale de l'Heure, l'Union Radio-Scientifique Internationale et la Commission d'Etudes n° VII du C.C.I.R. recommandent que la valeur de la fréquence indiquée par le Bureau International de l'Heure soit utilisée par les organismes désirant transmettre un temps uniforme et une fréquence constante.

Le Chef des Services,
N. Stoyko.

UNIFORM TIME AND CONSTANT FREQUENCY FOR THE YEAR 1963

Statement from the International Bureau of Time, November 29, 1962

After the decision of the International Committee of Time, I.A.U., at Berkeley, in August 1961 and the General Assembly of the U.R.S.I. at London, in September 1960, and C.C.I.R.'s Study Group VII in Geneva, April-May 1962, the International Bureau of Time, after having consulted the observatories which have cesium atomic resonators and after comparing their astronomical observations, has calculated the nominal value of the frequency to transmit during the year 1963.

$$-130 \times 10^{-10}$$

with regard to the scale of time such that the frequency of cesium has the value :

$$f\,(\mathrm{Cs}) = 9\,192\,631\,770\ \mathrm{c/s}$$

The value indicated will not change during the course of 1963. It is the same as the 1962 value.

The International Committee of Time, the U.R.S.I. and Study Group VII, C.C.I.R. recommend that the value of the frequency indicated by the International Bureau of Time be utilized by the organisations desiring to transmit uniform time and constant frequency.

N. STOYKO.
Chief of Service

FREQUENCY AND TIME BROADCASTS

Australian Report

The National Standards Laboratory has made continuous records of the phase and amplitude of the NBA (18 kc/s) and the GBR (6 kc/s) transmissions as received at Sydney. Observations have been made for some months and the more important results are summarized below.

(*a*) Integration over 24 hours gives the mean phase to within a few microseconds.

(*b*) Phase plots show sudden changes in rate of the order of 1 in 10^{10} which are assumed to be transmitter adjustments.

(*c*) Over a period of 1 month the average frequency difference between NBA and GBR was 1.3 parts in 10^{10}.

(*d*) The diurnal phase variation shows anomalies at times which are due to interference between short and long path transmission. It is possible to accumulate errors of $\pm 2\pi$. This could be a serious problem in any system involving the automatic frequency control of a remote transmitter.

RADIO MEASUREMENTS AND STANDARDS

1. — *The Cross-Capacitor as a Calculable Standard.*

The potentialities of the cross-capacitor as a calculable standard have been very fully investigated. It is considered that with care in the manufacture of the cylinders an accuracy of 2 parts in 10^8 can be achieved.

2. — *Impedance Measurements.*

A method has been developed to measure the properties of coaxial connectors and other transmission line elements to an accuracy of the order of 0.1 %. The technique which has been used in the frequency range 300-2800 Mc/s is a resonance one in which the unknown is placed successively in high current and high voltage parts of the system.

3. — *Standard Attenuator*

A standard attenuator has been developed for the radio and microwave ranges. It is a waveguide beyond cut-off type operating at a frequency of 31.25 Mc/s. The attenuation is read from an optically projected scale 0-200 db with a resolution better than 0.001 db. Attention is being given to the development of auxiliary equipment capable of generating and measuring radio frequency power with a high order of stability so that the full advantage can be taken of the accuracy of the attenuator.

Commission III
Radioélectricité et Ionosphère

PREVISIONS
POUR LA PROPAGATION IONOSPHERIQUE

Le Centre National d'Etudes des Télécommunications (CNET) du Ministère Français des Postes et Télécommunications a publié un fascicule intitulé : « Instructions d'emploi des prévisions pour la propagation ionosphérique des ondes radioélectriques ».

Nous reproduisons ci-après l'Avertissement qui précède cet ouvrage :

1. La division des prévisions ionosphériques nationale (DPI) du Centre National d'Etudes des Télécommunications établit chaque mois des prévisions à long terme pour la propagation ionosphérique des ondes radioélectriques.

2. Lorsque les utilisateurs d'un même document de prévision sont nombreux, celui-ci est imprimé et diffusé dans un bulletin mensuel, composé de plusieurs parties publiées en autant de séries

distinctes de fascicules, le *Bulletin de prévisions ionosphériques* (BPI). Ce bulletin présente des graphiques de propagation, sans texte explicatif. La présente instruction, éditée séparément, est destinée à guider l'utilisateur dans l'emploi de ces graphiques.

3. Ce bulletin de prévisions de la DPI comprend actuellement cinq parties. *Première et Deuxième Parties*, « BPI (I) » et « BPI (II) » : prévisions valables pour de petites et moyennes distances, dans des zones normalisées.

Dans ces deux séries de fascicules, sont rassemblées des prévisions normalisées valables dans dix zones géographiques sélectionnées. Elles conviennent aux utilisateurs exploitant, dans ces zones, des liaisons à des distances inférieures ou égales à 3000 kilomètres.

La première partie contient (planche 00 à 39) les graphiques de prévision des quatre zones dites : « Europe », « Méditerrannée », « Afrique du Nord », « Europe du Nord ».

La deuxième partie contient (planches 40 à 99) les graphiques de prévision des six zones dites : « AOF », « AEF et Côte des Somalis », « Côte Sud de l'AOF », « Afrique centrale », « Madagascar », « Indochine ».

Troisième partie « BPI (III) » : prévisions de point à point.

Dans cette série de fascicules sont rassemblées des prévisions de point à point à moyennes et grandes distances jugées d'intérêt général.

Quatrième et cinquième parties « BPI (IV) » et « BPI (V) » : prévisions de portée.

Dans ces deux séries de fascicules sont rassemblés des graphiques donnant les limites de portée jusqu'à 6000 km pour différentes fréquences, lorsque l'extrémité fixe de la liaison est respectivement Paris, pour la série BPI (IV) et Dakar pour la série BPI (V).

4. Le domaine de responsabilité de la DPI est limité à la propagation ionosphérique proprement dite. Les prévisions présentées sont établies par des méthodes de calcul propres à la section, qui sont essentiellement celles de l'ancien SPIM (Service de prévision ionosphérique militaire). Le calcul est effectué à partir des mesures des stations ionosphériques de la section, ainsi que de toutes les mesures qu'il est possible de rassembler. Il est fait usage des cartes d'ionisation du CRPL américain et du RRB britannique.

5. Des informations concernant les « Perturbations de propagation ionosphérique » (appelées parfois et assez improprement « prévisions à court terme ») sont établies par la DPI. Elles sont diffusées à un nombre restreint de correspondants et font l'objet d'une instruction particulière.

ELECTRON DENSITY PROFILES

The CRPL has issued the Technical Note 40-8 « Mean Electron Density Variations of the Quiet Ionosphere », by J. W. Wright, L. R. Wescott and D. J. Brown.

Abstract

The CRPL has initiated a programme for large-scale computation of electron density profiles from ionospheric vertical soundings. Scaling is performed at field stations, permitting computation of hourly profiles at the Central Laboratory. These profiles are combined to form hourly mean quiet profiles for each station and month. The results of this programme for the month of October are illustrated graphically. This report is the eighth of a series illustrating the electron density variations in the mean quiet ionosphere between latitudes 15° N and 50° N along the 75° W meridian.

U.R.S.I.-C.I.G. Committee

IONOSPHERE PROGRAMME FOR THE I.Q.S.Y.

During the Symposium on Ionospheric Soundings in the I.G.Y./I.G.C. (Nice, December 1961) resolutions were drafted on ionospheric vertical soundings, absorption and drift measurements during the I.Q.S.Y. : see Minutes of the Second Meeting of the U.R.S.I.-C.I.G. Committee, *U.R.S.I. Bulletin*, No. 131, pp. 24-31. These resolutions were subsequently communicated to the I.Q.S.Y. Committee of C.I.G. in March 1962 by Dr. W. Dieminger, C.I.G. Reporter for Ionosphere, together with recommendations concerning other fields of interest obtained by correspondence between the Secretary and the appropriate sub-reporters.

Following considerations by the Ionosphere Working Group of the I.Q.S.Y. Committee of C.I.G. the objectives of the I.Q.S.Y. programme and the final version of the resolutions were formulated for the following aspects of the major synoptic programme :

VI Vertical incidence soundings,

A Ionospheric absorption,

D Ionospheric drifts,

N Atmospheric radio noise,

W Whistlers and VLF emissions.

The full text is given in section I below, reproduced from *C.I.G. News*, No. 6.

In addition to the major synoptic programme, consideration should be given to various special experiments. These include the following :

Vertical Incidence Experiments

Scatter sounding,

Partial reflections,

Cross modulation,

Absorption A4 (gated pulses),

Special HF vertical soundings for regional studies, close-space networks, control for other ionospheric experiments, e. g. rockets,

Special multi-frequency riometer.

Oblique Incidence Experiments

Backscatter B-1, fixed frequency,

Backscatter B-2, multifrequency,

Radar Aurora,

Forward scatter,

Oblique HF pulse transmissions,

Oblique CW, VLF and LF transmissions for N(h) of lower ionosphere.

Atmospheric Radio Noise

Spectral distribution of radiated energy,

Sferics.

Conjugate Point Experiments

Simultaneous measurements by several techniques.

Satellite Experiments

Topside soundings,
LF and VLF receiver,
Probes,
Beacon transmitters : Faraday rotation and Doppler.

Rocket Experiment

Dynamics of ionosphere and exosphere,
Jackson-Seddon dispersion experiment,
Medium frequency radio absorption,
Langmuir probe,
r. f. resonance probe,
ion trap
r. f. mass spectrometer,
X-ray photometer,
ultra-violet photometer,
Lyman-alpha photometer,
Topside sounding from rocket.

Some notes on a few of these experiments are added in section II after the recommendations on the major synoptic programme.

G. M. BROWN,
Secretary, U.R.S.I.-C.I.G. Committee.

I. - MAJOR SYNOPTIC PROGRAMME FOR THE I. Q. S. Y.

Vertical Incidence Sounding (VI)

OBJECTIVES

The vertical sounding programme objectives are similar to those of the I.G.Y. with the following major additions :

(*a*) The solar cycle variation of all types of ionospheric behaviour deduced from vertical sounding data when I.Q.S.Y. and I.G.Y. results are compared.

(*b*) Increased emphasis on electron density profile determinations on a regional and world basis.

(*c*) Application of vertical sounding observations in conjunction with rocket and satellite ionospheric observations on the ionosphere.

1. — Observing Programme

It is recommended that vertical sounding stations follow the observing schedule recommended for the I.G.Y. It is particularly emphasized that I.G.Y. experience has demonstrated that for most scientific and practical purposes the maximum interval between soundings should not exceed fifteen minutes. The plan to take soundings at 5-minute intervals on RWD and SWI should be continued. It is noted that, during the I.G.Y., many stations found the *f*-plot to be a satisfactory and sufficient method of reduction for those soundings which are not represented in tables of hourly values.

2. — Observing Techniques

It is recognized that new techniques will form an essential part of I.Q.S.Y. ionospheric measurements, but it is to be remembered that one of the primary objectives of I.Q.S.Y. is to obtain measurements during the solar minimum period which can be compared with those obtained during the solar maximum of the I.G.Y. It is essential that this latter point be borne in mind whenever new techniques and/or methods of data reduction developed during and since the I.G.Y. are employed.

It is recommended that the instrumentation at vertical sounding stations be improved wherever possible by extending the lower limit of the frequency range to 250 kc/s and improving antenna efficiency particularly for the lower part of the frequency range.

3. — Distribution of Stations

General.

Since a main purpose of the I.Q.S.Y. is to provide complementary data of the I.G.Y., it is recommended that the overall world coverage be not less than that during the I.G.Y.

As a general principle, it is important that stations started since the last sunspot minimum operate during the I.Q.S.Y.

All stations which are to be started or re-established for the I.Q.S.Y. should commence operation well in advance, as it is important fully to cover the minimum period.

The necessity is stressed for maintaining a consistent system of station identification coding, particularly to facilitate mechanical data handling, and accordingly responsible administrations are requested to inform the W.D.C.s or the U.R.S.I.-C.I.G. of any new stations set up for the I.Q.S.Y., so that standard identification numbers and letters can be assigned.

As a result of the operation of one or more topside sounding satellites during I.Q.S.Y. considerably more information on the spatial variations in *fo*F2 will undoubtedly be available from certain regions of the world. However, since data storage facilities are not likely to be incorporated into the early satellites, coverage will generally be limited to regions within about 2000 km of the rather small number of existing telemetry stations. There is little doubt that in the future the topside sounding technique will provide much of the information on *fo*F2 required for mapping purposes.

A partial list of vertical sounding stations planned to be operated during I.Q.S.Y. has been prepared. This list is based on responses to a questionnaire distributed by the Reporter for Ionosphere, supplemented by national programme documents and by special information given to the Reporter. The list will not be complete until all national reports have been received.

Having reviewed the prospective distribution of stations during I.Q.S.Y., the Working Group calls attention to the following considerations :

Meridional Chains.

It is particularly important that the four meridional chains of stations, identified in the I.G.Y. programme, be as complete as possible during I.Q.S.Y. Highest priority should be given to completing the meridional chains by ensuring that observations are made at the following locations :

(i) 70°-80° *W Chain* (*the Americas*).

Panama - N. Columbia area. Large F-region electron density gradients occur in this general location and a station is needed to fill the gap of 15° in latitude between Bogota and Puerto Rico.

(ii) 10°-20° *E Chain* (*Europe, Africa*).

Tsumeb - an important station in the transition zone of the south equatorial chain.

Grahamstown - needed for East-West studies in an anomaly zone.

Marion Island - a station at this location would extend the chain to the south and also increase the coverage in the Antarctic region. This location takes an increased scientific importance because it is conjugate to the high density of stations in western Europe.

Tamanrasset - essential from both geographic and magnetic considerations.

Bangui - needed to define the equatorial trough in this zone.

Teneriffe - this proposed station would help define the big gap between Tamanrasset and Rabat, and is important to European-African communications.

Longyearbyen - extends the chain to the north and also provides important information about the secular movements of the auroral zone.

Leopoldville, Elisabethville, Bunia and Lwiro - the value of the chain would be very much reduced without these stations in an area important for the understanding of ionospheric behaviour around the southern maximum of *fo*F2.

Nigeria, on magnetic equator - this location should be occupied for regional studies in conjunction with Ibadan, linking ionospheric and magnetic phenomena.

(iii) 70°-90° *E Chain* (*U. S. S. R., India*).

Ceylon - important in the study of the longitude changes in ionospheric gradients close to the magnetic equator.

(iv) 130°-150° *E Chain* (*Australia, Japan, U. S. S. R.*).

Cebu - close to the magnetic dip equator in a region where the dip equator is furthest north of the geographic equator, and thus of special value in comparison with Huancayo.

Djakarta - full I.Q.S.Y. operation is most desirable since this location is close to the suspected position of one of the latitudinal peaks in ionization density.

North of Singapore - it would be most valuable if measurements were available from a station in latitude 10°-15° N in the longitude zone of Singapore for use jointly with Singapore data to define the transequatorial profile in this zone.

Other Stations.

In addition to strengthening the meridional chains, it is important that, as far as possible, stations be located for the I.Q.S.Y. in the

following areas from which vertical soundings have not been available previously :

Gough Island - this location defines the extent of the Weddell Sea - Capetown anomalies in height and critical frequency parameters.

Easter Island - this seems the only possible practical location for a station in the Southeast Pacific Ocean. Data from this region are very desirable for morphological studies.

East Africa, Uganda, Kenya - this area is particularly suitable for the detailed study of the sensitivity of equatorial ionospheric behaviour to moderate changes in longitude.

Addis Ababa - this would contribute to the study of the fine structure of the equatorial ionosphere in this zone.

Antarctica. The I.Q.S.Y. represents the first opportunity for obtaining any appreciable information on the behaviour of the Antarctic ionosphere during a minimum sunspot period, and bearing in mind the extensive use alrady made of I.G.Y. data from this area it is obviously very important that as many as possible of the stations that were operated during and since the I.G.Y. be continued during I.Q.S.Y. Whenever possible, stations which operated during I.G.Y., but which are not now active should be re-established for I.Q.S.Y. and in addition observations from some new sites would help solve scientific problems raised by I.G.Y. studies ; these include :

Syowa - Data during I.Q.S.Y. from this point will help fill out the map of the Antarctic ionosphere and complement previous measurements from this location.

Vostok - it is extremely important to obtain the solar cycle dependence of ionospheric parameters near the geomagnetic pole.

South Ice (about 80° S, 30° W) - data from this location would throw light on the physical mechanisms operating in the major Weddell Sea anomaly.

Maudheim - if existing studies at this station could be extended to include ionospheric observations this would help fix the eastern boundary of the Weddell Sea anomaly.

Roi Baudouin - an especially important location which contributed to the delineation of south polar ionospheric phenomena during the I.G.Y.

Sentinel Mts. - a station at this location would be valuable for (*a*) sub-auroral conjugate point studies, (*b*) additional ionospheric

information in a region of Antarctica where marked spatial variations exist.

In addition to their invaluable contribution to the scientific experiments, ionospheric data from Antarctic stations, as recommended above, will contribute to the safety and efficiency of station and expedition operations, since almost no data exist for solar minimum on which to base radio propagation predictions for practical communications within Antarctica and to the outside world.

Ocean Areas.

In order to gain more information about the ionosphere over the large ocean areas it is recommended that greater emphasis be placed on the use of shipboard ionosondes. This is a technique which has matured during and since the I.G.Y. Soundings from research vessels at relatively fixed locations for extended periods (of at least one week's duration) would be most suitable. Observations from a moving ship are also useful, for example for transequatorial F-region studies.

The possibility of using weather ships and other semi-stationary vessels as ocean ionosphere stations should be re-examined.

Special closely-spaced chains.

Special and co-ordinated closely-spaced chains of equatorial stations are recommended for operation during I.Q.S.Y.

As a result of I.G.Y. experience, it is realized that it is important to locate stations in such a way that studies can be made of phenomena occurring along the magnetic equator as well as across it. For example the study of temporal variations in the occurrence of equatorial Spread F would be greatly aided by a suitable triangular network of stations in order to resolve the directions of the equivalent drifts. Three particularly suitable areas are in Peru, Ghana-Nigeria, and India-Ceylon.

Floating Ice Stations.

The floating Arctic ice stations operated during the I.G.Y. seem to have been successful where the severe technical difficulties were overcome. Complementary data for I.Q.S.Y. from the area of the interior of the Arctic basin would be most valuable to the I.G.Y.-I.Q.S.Y. world geophysical experiment.

Magnetically Conjugate Pairs.

The value of pairs of geophysical stations within 300 km of magnetically conjugate points is becoming increasingly apparent, operated either as synoptic stations or for short term experiments. Vertical soundings should be included in the programme for such conjugate pairs. It seems opportune to use existing stations as one station of each pair. A partial list of pairs which are certainly scientifically desirable and perhaps logistically practical, would include :

Byrd (existing)	Great Whale River (conjugate)
Lander	Unalaska
Kerguelen	Archangelsk
Mirny	Murmansk
Dumont d'Urville	Fairbanks
South of France	Capetown
Vostok	Thule

4. — Data Flow to W.D.C.s

4.1. — *Vertical Soundings Data*

It is recommended that the flow of I.Q.S.Y. vertical soundings data to the W.D.C.s follows the principles of the I.G.Y. Guide, with suitable modifications to take into account the revisions in the programmes of observation and reduction outlined below. It is recommended that the ionogram interchange part of an I.Q.S.Y. Guide follow the recommendations made previously by U.R.S.I.-C.I.G. for the years 1959, 1960, etc. It is further recommended that the Guide contain proposals for a plan to enable W.D.C.s to maintain an index of the periods of observation of special and temporary vertical sounding stations, and the location of the ionograms and any regularly reduced data from stations if these are not deposited in the W.D.C.s.

Recommended Programmes of Ionogram Reduction and Presentation of Data.

Synoptic Stations : It is recommended that stations undertake reduction programmes A, B, C or D, depending on criteria such as latitude of station, the average accuracy of the ionograms, access to computing facilities, the programmes being undertaken at neighbouring stations, special regional plans, etc. It is re-

commended that stations notify the C.I.G. Reporter of their tentative plans for reduction in order to achieve, by informal co-ordination, well-balanced reduction plans along the meridional chains of stations and within regions.

A. — *Programme for high latitude stations.*

Hourly values : (*a*) *fo*F2, *fo*F1, *fo*E*s*, *fb*E*s*, *f*min,
(*b*) *h'*F, *h'*E*s*, *h'*E where height accuracy allows,
(*c*) M3000F2 or MUF 3000F2,
(*d*) E*s* types.

f-plots : all days.

Profile Parameters : attention is drawn to the possibility of obtaining monthly median profiles at high latitude stations using the median *h'f* technique. It is to be hoped that at least representative sample profiles will be produced and interchanged.

B. — *Basic Programme for temperate and low-latitude stations.*

Hourly values : (*a*), (*b*), (*c*), (*d*) as above

f-plots : (*a*) S.W.I.s, all stations.
(*b*) All days at selected representative stations in each region. Where an organization operates several stations, at least one should produce *f*-plots for each day.

C. — *Composite basic and profile programme for temperate and low latitude stations.*

Hourly values : (*a*) *fo*F2, *fo*F1, *fo*E, *fo*E*s*, *fb*E*s*, *f*min,
(*b*) - - - - -
(*c*) M3000F2 or MUF 3000F2,
(*d*) E*s* type.

Profile parameters : average profiles from monthly median *h'f* pattern for at least 12 hours (00,02, - - - UT).

D. — *Mainly Profile programme for temperate and low latitude stations.*

Hourly values : (*a*) Direct scaling from ionograms : *fo*F1, *fo*Es, *fb*Es, *f*min,
(*b*) Indirect computed values from the profile data : *fo*F2, *fo*E,
(*c*) From either direct scaling or computed curves, as is most convenient : M3000F2,
(*d*) Profiles of ionization with height for every hour.

4.2. — *Top-side Sounding Data*

Hitherto, no plans have been drafted by the U.R.S.I.-C.I.G. Committee for the flow to W.D.C.s of ionospheric data obtained by topside sounding techniques. It may well be that during I.Q.S.Y. such topside sounding experiments will constitute a significant part of the total data on the ionosphere. It is strongly recommended that these data, in suitable form, should be deposited within a reasonable time in the W.D.C.s.

Absorption observations (A)

1. — Objectives

The main objectives of the I.Q.S.Y. absorption programme are :
(*a*) To complement the data obtained during the I.G.Y. so that the solar cycle variations of absorption can be determined.
(*b*) To delineate geographic areas in which comparable absorption phenomena occur.
(*c*) To study diurnal, seasonal and solar cycle variations of absorption in each such geographic area and the connection with local and worldwide magnetic activity.

2. — Methods

The methods of measuring ionospheric absorption fall into the following main groups :

A-1 Measurement of the amplitudes of pulses reflected from the ionosphere.

A-2 Measurement of the absorption of extra terrestrial radio noise.

A-3 Measurement of the field strength of sky wave signals at oblique incidence.

In addition, relative changes in absorption can be measured qualitatively using ionogram parameters, in particular *f*-min.

3. — Distribution of stations during I.Q.S.Y.

It is important that the stations which operated during I.G.Y. continue during I.Q.S.Y.

(*a*) *Equatorial latitudes.*

Absorption measurements obtained during the I.G.Y. indicate that considerable changes of absorption with longitude occur between Malaya and Africa. It is important that suitable similar measurements be made in other longitude zones, such as in South America.

(*b*) *Temperate latitudes.*

The existing distribution of A1 stations in Europe and Asia is adequate. The situation in North America is not so satisfactory, and in the southern hemisphere it appears that only one A1 station is likely to be operating. Since less accurate methods of measuring absorption can only be calibrated against A1-type data it is clear that some additional A1 stations should operate during I.Q.S.Y.

In this connection it is relevant to note that I.G.Y. data have shown that in the northern hemisphere between about 40° and 60° magnetic latitude abnormally high winter absorption in Europe or Asia was associated with relatively low absorption in America. It would be valuable to know whether a similar phenomenon occurs in the southern hemisphere, and modest A1 or A3 measurements would be sufficient for this purpose.

(*c*) *Sub-auroral and high latitudes.*

Although the intense absorption sometimes present during disturbed periods is best measured by the A2 method, analysis of I.G.Y. data has shown that there are occasions when methods A1 and A3 detect changes in absorption to which method A2 appears relatively insensitive. It is therefore desirable that methods A1 and A3 should be employed at least at some stations, particularly in the Antarctic polar cap where no such observations have yet been made.

(*d*) It is strongly recommended that riometers (A2) be used at magnetically conjugate points wherever this is possible.

e.g. Byrd	Great Whale
Lander	Unalaska
Kerguelen	Archangelsk
Mirny	Murmansk
Dumont d'Urville	Fairbanks
Vostok	Thule
South of France	Capetown

4. — Programme of observations

For A1 measurements the programmes generally adopted during the I.G.Y. are suitable and adequate. Where facilities are available it is desirable to make measurements on a group of frequencies in quick succession so as to allow a fuller analysis of the frequency variations.

In those cases where the full A1 method is not applicable a simplified A1 method may be used. In this method the amplitude of a gated pulse is recorded continuously. The record may be used to give the diurnal variation of absorption.

Both A2 and A3 measurements involve little effort to maintain and should be more widely used where manpower limitations preclude the use of method A1.

Existing A3 stations should continue with their I.G.Y. programmes. New A3 experiments should be planned to use the 1E ordinary wave mode.

Daily recording should be maintained for as many hours as possible and measurements should be made at least at the following times :

(*a*) Near noon to give the maximum normal absorption for the day.

(*b*) At night, for calibration purposes, when ionograms show that E region reflections are likely to be dominant and the absorption is low.

(*c*) At other times during the day, to give the diurnal variation of absorption. It should be noted that the value of diurnal changes in field strength depends on the accuracy of calibration and on whether changes due to additional modes can be identified, and measurements are thus useful only when these conditions are fulfilled.

5. — Special programmes

It is recommended that special programmes are initiated for better knowledge of D and lower E layer by means of :

(*a*) Partial reflection techniques,

(*b*) Cross modulation techniques combined with suitable measurements with rockets.

It is desirable to attempt to discover the geomagnetic cut-off for the cosmic radiation which generates the normal ionization at low heights in the ionosphere, by A2 methods.

Drift Observations (D)

1. — Objectives

(*a*) To resume measurements of ionospheric drifts at as many as possible of those stations which operated during the I.G.Y.

(*b*) To set up other stations in locations specified broadly in section 2.3. below.

(*c*) To measure drifts by several methods, such as those specified below, and to inter-compare the results.

2. — Programme of observations

2.1. — *Synoptic*

Evaluation of I.G.Y. drift observations has shown that, in order to obtain satisfactory statistical results, it is necessary to have a large number of observations spread in time. It is therefore

recommended that, during I.Q.S.Y., drift observations should be made according to the following schedule :

(i) About 10 days every month according to an international calendar containing (*a*) World Synoptic Intervals, (*b*) Regular World Days, (*c*) Two observation days in the middle of every week not covered in (*a*) or (*b*).

(ii) Every station should aim at taking observations at least once an hour on each frequency used. Uniform coverage should be attempted over the 24-hours.

2.2. — *Special Projects*

It is particularly emphasized that drift experiments be made simultaneously at those sites where the rocket technique of producing artificial clouds is applied, either optical or radio methods being used to track the cloud.

2.3. — *Distribution of Stations*

2.3.1. — The geophysical distribution of stations proposed for I.Q.S.Y. is such that mapping should become possible in certain zones of the world for D1-type stations. This should be the case, in particular, for the European and Western areas.

It is recommended that efforts should be made to make observations in Africa between the Mediterranean sea and an area to the south of the equatorial belt.

2.3.2. — It is strongly recommended that drift observations be made at as many as possible of the Arctic and Antarctic stations.

3. — Instruments and Techniques

3.1. — *Standard methods*

Measurements may be made by the following methods which are listed below in the order of importance attached to them :

D1 Fading intercomparison at three or more antennae spaced at about one wavelength.

D2 Radio observations on drifting meteor trails.

D3 Radio star fading with three or more antennae spaced at about 10 km.

3.2. — *Intercomparison*

3.2.1. — All those methods of drift observation given in 3.1. were successfully used during the I.G.Y. but there is need for detailed inter-comparison at certain common locations.

3.2.2. — Intercomparisons should be made using method D1 on different frequencies in order to obtain information on the D, E and F regions.

3.2.3. — It is not yet clear what features of the fading pattern are drifting with the ionospheric plasma. It is important that the two main methods of record analysis, i.e. those of similar fades and of correlation analysis, be intercompared more seriously by experimental work on the same samples, as well as by all other possible ways. This is applicable to methods D1 and D3.

3.2.4. — It is important, in the case of method D2, that the sensitivity of the equipment should be high enough to permit a satisfactory statistical coverage. This has not always been the case in the past.

Investigations of Atmospheric Noise (N)

1. — Objectives

The objectives of the work proposed for the I.Q.S.Y. are to :

(*a*) Explain the generation of noise and evaluate the energy radiated from lightning discharges at all frequencies.

(*b*) Describe quantitatively the distribution of the incidence of lightning discharges over the whole world, in statistical terms.

(*c*) Use current knowledge of propagation to assess the probable noise intensities at a number of receiving locations of particular interest, including those where regular measurements of noise are in progress. Allowance would be made for the directivity of the receiving antenna.

2. — Programme of Observations

2.1. — *Synoptic*

It is recommended that effort should be concentrated on observations designed to provide information on the following items to extend the work performed during the I.G.Y. :

(*a*) The statistical distribution of the incidence of lightning discharges. The extensive use of simple lightning flash counters would probably be suitable for this purpose.

(*b*) The spectral distribution of the radiated energy.

(*c*) The integrated noise level as carried out during the I.G.Y.

(*d*) The waveform of atmospherics.

2.2. — *Special Projects*

(*a*) Noise measurements might well be extended into the ELF range. The theory that noise at these frequencies, measured at any station, is a good index of the total noise generated over the whole world, should be checked at several stations.

(*b*) Should any experiments be performed in rockets and satellites consideration must be given to the provision of the appropriate supporting ground organization.

2.3. — *Distribution of Stations*

(*a*) Item 2.1 (*a*) should be carried out in co-operation with WMO, as this organization is interested in problems involving the use of lightning flash counters.

(*b*) Item 2.1 (*b*) has been performed hitherto in temperate regions only. Work should be extended to the tropics.

3. — Instruments and Techniques

Particular attention should be given to the accurate calibration of apparatus used for measuring integrated noise levels. A rapid interchange of data between stations making such measurements should be arranged so that a continual comparison and check on accuracy may be made.

Whistlers and VLF Ionospheric Noise (W)

1. — Introduction

During the I.G.Y. tape recordings of whistlers and V.L.F. ionospheric noise were collected from many stations in the northern and southern hemispheres. Auroral data summaries were sent

to the world data centres. In addition to providing useful statistical data on occurrence of various phenomena, these summaries have served as a catalog of activity on the tapes. Spectral studies of whistlers selected from this catalog have led to important new results on the distribution and variation of electron density in the magnetosphere, including diurnal, annual, solar cycle and magnetic storm effects. The connections between V.L.F. ionospheric noise and whistlers have been better defined. New relations have been discovered between V.L.F. ionospheric noise and other phenomena such as aurorae and magnetic variations.

During I.Q.S.Y. synoptic observations similar to those taken during I.G.Y. are needed to define the effect of solar activity on the properties of whistlers and V.L.F. ionospheric noise. In addition, new special programs on E.L.F. noise, continuous V.L.F. noise observation, fixed-frequency whistler-mode observations, and satellite observations of whistlers and V.L.F. ionospheric noise are recommended.

2. — Synoptic Observations

It is recommended that the I.G.Y. whistler programme be repeated at selected stations for which data of good quality were obtained during the I.G.Y. These stations should be selected to provide good geographical coverage, including low, medium and high geomagnetic latitudes. Special emphasis should be given to pairs of magnetically conjugate stations. It is further recommended that the frequency range 15-20 kc/s be included so that V.L.F. code transmissions will be available for accurate relative timing.

3. — Data

It is recommended that numerical values of whistler dispersion for each hourly sampling period of each day be supplied to the world data centres for both the I.G.Y. and the I.Q.S.Y. at as many of the synoptic stations as possible. Complete information on the method of data reduction should also be supplied.

4. — Continuous V.L.F. noise recording

To obtain a full picture of the time variation of V.L.F. ionospheric noise it is recommended that continuous recordings be

made in the range of the synoptic whistler observations (usually 300 to 30,000 cps). Of principal interest are stations at medium and high latitudes. Accurate amplitude information should be provided.

5. — E.L.F. noise

Between the lower frequency limit of the standard whistler recorder (about 300 cps) and the upper frequency limit of observations of geomagnetic field fluctuations (about 10 cps) is a region where strong ionospheric noise can be observed. It is recommended that continuous recordings in the band 10-300 cps be carried out at stations engaged in continuous V.L.F. noise recording, particularly those at high latitudes.

6. — Conjugate point noise observations

Special efforts should be made to determine the relation between noise observed at geomagnetically conjugate points. Of particular importance are locations just outside, in and inside the auroral zones.

7. — Fixed-frequency whistler-mode propagation

The properties of whistler-mode propagation can be studied using pulses from high power V.L.F. transmitters. It is recommended that whistler stations make regular measurements of the relative intensity and group delay of any V.L.F. pulse transmission which can be received in the whistler mode.

8. — Rocket and satellite observations

It is recommended that whistler-mode propagation and the origin of V.L.F. ionospheric noise be studied by means of rockets and satellites. In such experiments coordinated ground measurements should be undertaken over the range of geomagnetic latitudes covered by the rocket or satellite.

9. — Related disciplines

It is recommended that wherever possible whistlers and V.L.F. ionospheric noise be recorded at locations where other ionospheric and magnetic measurements are made. Phenomena which are

thought to be connected with whistlers and V.L.F. ionospheric noise include auroral fluctuations, both visual and optical, geomagnetic micropulsations, magnetic storms, F region electron density, and ionospheric absorption. Measurement of all of these phenomena will therefore be of interest at whistler stations.

II. — Some Special Experiments during the I. Q. S. Y.

Scatter Sounding

The possibility of the use of incoherent scatter sounding, developed since the I. G. Y. offers an important means of studying the ionosphere and exosphere.

Stations in a position to function during the I.Q.S.Y. include :

— Lima, Peru (N.B.S., U. S. A.).
— Porto Rico, Porto Rico (Cornell University, U. S. A.).
— Stanford, California (Stanford University, U. S. A.).
— Cambridge, Massachusetts (M.I.T., U. S. A.).
— Nançay, France (C.N.E.T., France).
— Malvern, England (R.R.E., U.K.).

All these stations will be able to measure density profiles and it is desirable that these measurements be compared with those obtained from conventional vertical sounding from below and other possible measurements of the upper ionosphere, especially topside soundings from satellites. It is also recommended that the times of measurements adhere to those adopted for conventional vertical soundings.

The particular organization of the various stations also allows other types of measurements to be made (temperature, composition, ionospheric movements).

Such measurements are strongly recommended during I.Q.S.Y., and it is recommented that operations are coordinated so as to permit the possibility of comparison with other methods leading to the same parameter.

Radar Aurora

The continued study of aurorae by the radar echo technique is strongly recommended and ought to be made in conjunction with other methods of studying aurorae.

The radar auroral stations anticipated for the I.Q.S.Y. are :

— U. S. S. R. : Murmansk, Tixie Bay, Dixon Is., Mirny.

— U. S. A. : Barrow (Alaska), Cold Bay (Alaska), College (Alaska), Kenai (Alaska), Kodice (Alaska), Pullman (Washington).

— France : Port aux Français (Kerguelen), Dumont d'Urville (Terre Adélie).

— U. K. : Halley Bay (Weddell Sea).

— Australia : Tasmania.

— New Zealand : Invercargill.

Forward Scatter

During the I. G. Y. the use of metre wave links, practical in high latitudes, provided important information on the occurrence and extent of abnormal absorption due to the incidence of corpuscles (P. C. A. events).

At middle latitudes the same techniques provide information on the ionized trails produced by meteors, the occurrence of sporadic E, and movements in the low ionosphere.

It is strongly recommended that

(1) the efforts for the scientific use of practical links made during the I.G.Y. be continued and extended during the I.Q.S.Y.

(2) an effort at international cooperation be undertaken for the creation of a link network in the Antarctic zone, of purely scientific character, to furnish information complementary to that provided by riometers

Oblique Incidence and Back-Scatter Experiments

Taking into account the importance of oblique incidence and back-scatter observations for a better knowledge of long-distance propagation and ionospheric phenomena, it is recommended that :

(*a*) Oblique incidence and back-scatter experiments should systematically be repeated during I.Q.S.Y. as they have been done during I.G.Y. and possibly incremented, by all suitable techniques, including accurate determination of propagation time of signals, by utilizing continuous time signals transmissions or special transmissions.

(*b*) The necessity of a statistical evaluation of data should be emphasized and continuous signal intensity records should be

made during selected time intervals, thus permitting a subsequent analysis.

Attention is drawn to the « Preliminary Directory of Oblique Incidence Sounding Activities » compiled by O. Sandoz, ad hoc Correspondent on Oblique Sounding for the U.R.S.I.-C.I.G. Committee, and giving a complete account and details on experiments conducted during the I.G.Y.

FUTURE ACTIVITIES

At the Fifth C.O.S.P.A.R. Meeting held in Washington in May 1962 the C.O.S.P.A.R. Working Group on I.Q.S.Y. discussed various matters which are pertinent to the activities of the U.R.S.I.-C.I.G. Committee. These items are summarized below, and the relevant resolutions adopted by C.O.S.P.A.R. are reproduced from the Report of the Meeting .

At the First Plenary Session of the C.I.G.-I.Q.S.Y. Committee held in Paris in March 1962 reference was made in the Report of Working Group II (Meteorology) to two aspects of interest to ionospheric scientists. These items are also reproduced below.

The attention of all members of the U.R.S.I.-C.I.G. Committee is called to these matters, and any comments or suggestions will be welcomed.

G. M. Brown,
Secretary U.R.S.I.-C.I.G. Committee

Utilization of Ionosphere Beacon Satellites

Important contributions to ionospheric research can be made from the determination of electron content using the Faraday and Doppler effects on radio waves transmitted from earth satellites. The future space programme of the U. S. A. includes the launching of a seven-frequency ionosphere beacon satellite in a polar orbit for world-wide ionospheric research, and international cooperation in its use is invited.

The Fifth C.O.S.P.A.R. Meeting unanimously adopted the following Resolution :

Res. 20. — *Beacon-type Satellites.*

« C.O.S.P.A.R. calls the attention of satellite lauching organizations to the need for regular launchings of ionosphere beacon-type satellites especially during I.Q.S.Y. and recommends that

observations of signals from such satellites be made on the widest possible geographical basis.

C.O.S.P.A.R. calls the attention of the U.R.S.I.-C.I.G. Committee to this resolution and invites the Committee to consider ways and means for the general coordination of a program of observations including the alerting of participants, the supply of orbital data, standardization of measurement techniques and the interchange of the results obtained. »

Sunspot Minimum Ionospheric Rocket Sounding Programme.

It is proposed that a cooperative set of rocket experiments should be undertaken internationally during the I.Q.S.Y. with a view to increasing our understanding of the physical processes in the D and E regions of the ionosphere. Various types of small rockets, capable of reaching a height range of 60-160 km, are to be used, and a variety of measurements is proposed including the use of photometers, probes, mass spectrometers, magnetometers, and absorption determinations. Launching sites should include auroral, medium, and magnetic equatorial latitudes.

The Fifth C.O.S.P.A.R. Meeting endorsed this proposal and formulated a resolution which included the following paragraph.

« It is essential that any rocket measurements should be accompanied by simultaneous measurements of ionospheric parameters near the launch point. Minimum measurements include :

(*a*) Vertical incidence ionosphere sounder.

(*b*) Cosmic noise riometer.

(*c*) Sky photometer (auroral stations only).

(*d*) Partial reflection technique for D region soundings.

It might also prove desirable to have a magnetometer at each station.

Synoptic Meteorological Observations.

Working Group II, Meteorology, of the C.I.G.-I.Q.S.Y. Committee has reported the following.

« It is probable that rockets capable of reaching a height of 120 km will be used for synoptic meteorological observations at some stations during I.Q.S.Y. The attention of ionosphere-scientists is drawn to this. »

Propagation of Atmospherics.

Working Group II, Meteorology, of the C.I.G.-I.Q.S.Y. Committee has suggested that meteorological services operating atmospherics networks may be able to assist in the ionospheric programme on the propagation of atmospherics. Arrangements for such cooperation should be made at a national level.

Space Radio Research Committee

UNITED KINGDOM

The British National Committee on Space Research, the Royal Society, has issued its « United Report for 1961 to the I.C.S.U. Committee on Space Research ». We publish the following parts of direct interest to U.R.S.I.

Radio propagation and the ionosphere

The ionosphere is being studied by methods involving radio propagation observations from both rockets and satellites.

The University of Wales, with the Royal Aircraft Establishment, have successfully carried out C. W. Doppler experiments using a Skylark rocket, and plans are proceeding for a pulse radio propagation experiment.

The Radio Research Station and the University of Sheffield are undertaking an experiment in which the nature of the wave field set up above a long-wave transmitter (200 kc/s) is explored by means of apparatus in a rocket. It is intended to make deductions about the electron distribution in the D region.

The properties of an electric dipole in a magneto-ionic environment are being studied at the University of Sheffield. Some progress has been made with the theoretical aspects of the problem and experiments are being prepared to measure dipole impedances in the ionosphere at frequencies from VLF to a few megacycles.

At the Nuffield Radio Astronomy Laboratories, University of Manchester, ionospheric studies have been carried out by observations of the transmissions from several satellites. Irregularities

of several per cent in the total ionization, with a size of several hundred kilometres, have been revealed. A joint study with several other European stations of scintillations in the transmissions from Sputnik III has also been published.

From Appendix I describing the experiments selected for the payload of NASA satellite S-52.

Galactic Noise

The measurement of galactic noise in the frequency range 0.75-3 Mc/s, and the exploration of the upper ionosphere (Dr. F. Graham Smith, Mullard Radio Astronomy Observatory, Cavendish Laboratory, University of Cambridge).

The aims of this experiment are :

(*a*) to measure the intensity of the galactic background at as low a frequency as possible under known conditions of receiver sensitivity and under known conditions of ionospheric effects on propagation and aerial impedance ;

(*b*) to watch for temporal or spatial variations of galactic radiation ;

(*c*) to explore the electron density in the upper F region.

The Report contains also a « Selected list of publications by U. K. Authors.»

DOCUMENTATION

L'attention des membres du comité est attirée sur : « Un système de télécommunication mondial par satellite », par le Dr H. Troller J. et A. C. Embrechts.

Conférence donnée dans le cadre du programme du Congrès Scientifique tenu à Luxembourg du 3 au 8 septembre 1962, à l'occasion des Journées Européennes des Télécommunications.

Journal des Télécommunications, Vol. 29, nº II, Nov. 1962.

BIBLIOGRAPHY

Attention of the members of the SRR Committee is drawn to : « A truly global satellite communication system », by Dr. H. Troller J. and A. C. Embrechts.

Lecture given within the programme of the Scientific Congress held in connection with the « Journées Européennes des Télécommunications, 3-8 September, 1962, in Luxemburg. *Telecommunication Journal*, Vol. 29, nº II, Nov. 1952.

PUBLICATIONS DE L'U. R. S. I.

XIIIe ASSEMBLEE GENERALE

Les fascicules ci-après du Volume XII (Comptes Rendus de l'Assemblée Générale de Londres) peuvent être obtenus au Secrétariat Général de l'U.R.S.I. aux prix indiqués (port compris) :

Fascicule 1. — Mesures et Etalons Radioélectriques	*Prix* : F.B. 140	$ 2.80
Fascicule 2. — Radioélectricité et Troposphère	225	4.50
Fascicule 3. — Radioélectricité Ionosphérique	350	7.00
Fascicule 4. — Bruit Radioélectrique d'Origine Terrestre	150	3.00
Fascicule 5. — Radioastronomie	350	7.00
Fascicule 6. — Ondes et Circuits Radioélectriques	700	14.00
Fascicule 7. — Radioélectronique	300	6.00
Fascicule 8. — Administration et Divers ..	140	2.80
Fascicule 6*bis*. — Ondes et Circuits Radioélectriques — Space Radio Relay	175	3.50

U. R. S. I. PUBLICATIONS

XIIIth GENERAL ASSEMBLY

The following parts of Volume XII (Proceedings of the London General Assembly) are available at U.R.S.I. General Secretariat at the under mentioned prices, postage included :

Part 1. — Radio Measurements and Standards	*Price* : B.F. 140	$ 2.80
Part 2. — Radio and Troposphere	225	4.50

Part 3. — Ionospheric Radio	350	7.00
Part 4. — Radio Noise of Terrestrial Origin .	150	3.00
Part 5. — Radio Astronomy	350	7.00
Part 6. — Radio Waves and Circuits	700	14.00
Part 7. — Radioelectronics	300	6.00
Part 8. — Administration and Miscellaneous	140	2.80
Part 6*bis*. — Radio Waves and Circuits — Space Radio Relay	175	3.50

* * *

Les publications ci-après sont en vente chez Elsevier Publishing Company, Amsterdam ou par l'intermédiaire du Secrétaire Général de l'U.R.S.I.

The following publications are on sale at Elsevier Publishing Company, Amsterdam or through the channel of the Secretary General of U.R.S.I.

XIIIe Assemblée Générale — XIIIth General Assembly

Monograph of Radioelectric Measurements and Standards.

Proceedings of Commission I on Radio Measurements and Standards during the XIIIth General Assembly, London, 1960. See *Inf. Bull.*, nº 133.

Monographie sur les mesures et étalons radioélectriques.

XIIIe Assemblée Générale, Londres, 1960.
Edited by B. Decaux.

6 × 9″, vi + 116 pages, 14 tables, 6 illustrations, 1961, 32 s., Dfl. 16.

Radio-Wave Propagation in the Troposphere.

Proceedings of Commission II on Radio and Troposphere during the XIIIth General Assembly, London, September, 1960.
Edited by J. A. Saxton, Department of Scientific and Industrial Research, Radio Research Station, Slough, Great Britain.

This monograph contains the papers invited by the chairman of the Commission and the major contributions to the discussions which followed the presentation of these papers. They were grouped under four main headings : 1. Experimental Data on Tropospheric Propagation ; 2. Physical Characteristics of the Troposphere ; 3. Tropospheric Propagation Theories ; 4. Radio-meteorology and Climatology. In reviewing the significance of the latest experimental radio and meteorological data, consideration was given to the problem of how far current theories of propagation satisfactorily account for the known facts. The Commission also discussed means for furthering experimental and theoretical studies in the field of tropospheric radio-wave propagation.

6 × 9″, viii + 196 pages, 7 tables, 55 illustrations, 1962, 48 s., Dfl. 24.—.

Ionospheric Radio.

Proceedings of Commission III on Ionospheric Radio during the XIIIth General Assembly of U.R.S.I., London, September, 1960. Edited by W. J. G. BEYNON, Department of Physics, University College of Wales, Aberystwyth, Great Britain.

In the course of the XIIIth General Assembly, Commission III met to consider and discuss a number of fundamental aspects of research into the ionosphere. The principal papers presented and summaries of the ensuing discussions are given in this volume. They are grouped under the following headings :

1. Electron Density/Height Profiles (N(h)) — 2. F2-Region Ionization — 3. Sporadic E Ionization — 4. Rocket and Satellite Data for the Ionosphere — 5. VLF Emissions and Hydromagnetic Waves — 6. Aurorae — 7. Ionospheric Scattering — 8. Ionospheric Drifts.

6 × 9″, viii + 262 pages, 2 tables, 49 illustrations, 1962, 65 s., Dfl. 32.50.

Radio Noise of Terrestrial Origin.

Proceedings of Commission IV on Radio Noise of Terrestrial Origin during the XIIIth General Assembly of U.R.S.I., London, September, 1960.

Edited by F. HORNER, Department of Scientific and Industrial Research, Radio Research Station, Slough, Great Britain.

At the XIIIth General Assembly, Commission IV dealt with the problem of terrestrial radio noise. This monograph contains the introductory papers for the various sessions with summaries of the ensuing discussions. The technical sessions were devoted to the following topics : Sources of Noise in Lightning. Properties of Natural Noise. I.G.Y. Whistler Data. Whistler Theory. The Exosphere (jointly with Commission III). Man-made Noise. VLF Propagation.

6 × 9″, viii + 202 pages, 4 tables, 34 illustrations, 1962, 48 s., Dfl. 24.—.

Rapports Spéciaux — Special Reports

N° 2. — *Tidal Phenomena in the Ionosphere.*
6 × 9 ″, 72 pages, 18 illus. 12s. Dfl 6, 1951.

N° 2. — *Les phénomènes de marée dans l'Ionosphère.*
6 × 9 ½″, 80 pages, 18 illustrations, 12 s., Dfl. 6, 1951.

N° 3. — *Les Sources discrètes d'émission radioélectrique extra-terrestre.*
6 × 9 ½″, 60 pages, 16 illustrations, 18 s., Dfl. 9, 1954.

N° 3. — *Discrete Sources of extra-terrestrial radio noise.*
6 × 9 ½″, 56 pages, 16 illustrations, 18 s., Dfl. 9, 1954.

N^{os} 4-5. — *Distribution de la brillance radioélectrique sur le disque solaire. L'hydrogène interstellaire.*
6 × 9 ½″, 16 pages, 6 s., Dfl. 3.00, 1954.

N° 6. — *Radio Observations of the Aurora.*
6 × 9 ½″, viii + 60 pages, 2 illustrations, 25 s., Dfl. 12.50, 1961.
See *Inf. Bull.*, n° 133.

N° 7. — *The Measurement of Characteristics of Terrestrial Radio Noise.*

The reception of a radio signal is influenced by the noise with which it must compete, and detailed studies of the interference characteristics of the noise are necessary. At the XIth General Assembly of U.R.S.I. a Sub-Committee was formed within Commission IV to study the question : « What are the most readily measured characteristics of terrestrial radio noise from which interference to different types of communication systems can be determined ? » This monograph is a report of the findings based on material submitted to the chairman of the Sub-Committee in September 1960.
6 × 9″, viii + 58 pages, 6 tables, 23 illustrations, 1952, 25 s., Dfl. 12.50.

Proceedings of meetings

Joint Commission on Radio-Meteorology, Stockholm, July, 1948.
6 × 9 ½″, 16 pages, 6 s., Dfl. 3.00.

Joint Commission on Radio-Meteorology, Brussels, August 1954.
6 × 9 ½″, 30 pages, 6 s., Dfl. 3.00.

Mixed Commission on the Ionosphere, Brussels, August 1954.
6 × 9 ½″, 238 pages, 70 s., Dfl. 36.00.

Some Ionospheric Results obtained during the International Geophysical Year.

Proceedings of a Symposium organised by the U.R.S.I.-A.G.I. Committee, Brussels, September, 1959.
Edited by Dr. W. J. G. Beynon.

The I.G.Y., a non-governmental enterprise consisting of a series of geophysical and solar observations carried out from July, 1957, to December, 1958, was an outstanding example of effective international cooperation in science.

The project succeeded in making remarkable advances into new fields of knowledge with short-term flexible machinery and, to a great extent, stimulated scientific performance.

One of the cooperating scientific unions was the International Scientific Radio Union (U.R.S.I.), which formed a « Special Commission for the International Geophysical Year » (later known as the U.R.S.I./A.G.I. Committee) under the Chairmanship of Sir Edward Appleton, with Dr. W. J. G. Beynon as Secretary. From 1954 to 1958 this Committee met annually to deal with all aspects of radio studies during the planning and operational phases of the I.G.Y.

The present volume contains an account of the proceedings of a symposium held in Brussels in September 1959, to discuss preliminary

ionospheric results obtained during the International Geophysical Year. During the symposium, which was attended by some 40 delegates from 14 countries, formal papers were presented and several valuable discussions were held. Summaries of the discussions are included in the book. The subjects are grouped under the following headings :
1. F2 Layer Phenomena — 2. High Latitude Studies — 3. Disturbance Phenomena — 4. Ionospheric Irregularities — 5. N(h) Profiles — 6. Absorption — 7. Drifts — 8. Noise, Whistlers, Rockets, Satellites.

6 × 9″, xii + 401 pages, 266 illustrations, 24 tables, 72 s., Dfl. 38.00.

Space Radio Communication.

A Symposium held under the auspices of U.R.S.I., Paris, 1961.
Edited by G. M. Brown, Department of Physics, University College of Wales, Aberystwyth, Great Britain.

At the XIIIth General Assembly, the Union's Committee for Space Radio Research proposed that a specialist symposium on Space Communications Research be held in the autumn of 1961. The present volume comprises the papers presented at this symposium, together with summaries of a number of stimulating discussions among the participants. The papers are grouped under the following items :
1. Introduction — 2. Launching, Attitude Control and Tracking of Satellites — 3. Frequency Allocation, Interference, and Propagation Problems — 4. Satellite Equipment — 5. Ground Equipment — 6. Modulation Systems — 7. Specific Communication System — 8. Miscellaneous Aspects - Author Index. List of Delegates.

6 × 9″, xii + 640 pages, 49 tables, 212 illustrations, 1962, 140 s., Dfl. 70.—.

U.R.S.I. Handbook of ionogram interpretation and reduction of the World Wide Soundings Committee.

Edited by W. R. Piggott, Radio Research Station, Slough, Bucks and K. Rawer, Ionosphären-Institut, Breisach/Rh., Germany.

The study of the ionosphere gained great impetus during the International Geophysical Year. Intensive research has also been stimulated by the development of rockets and satellites capable of penetrating the ionised zones.

This handbook was prepared by the World Wide Soundings Committee (W.W.S.C.) in response to many requests. It has the following aims :

1. To assist the personnel who analyse and interpret ionograms (for this purpose it has been written in a readily understandable way).
2. To enable workers not closely connected with major scientific organisations to carry out useful research on their data.
3. To give the international rules for ionogram interpretation in a form which will help to solve the practical problems encountered, together with the detailed reasons for adopting these rules.

4. To take account of the variations encountered by stations situated in polar, temperate or equatorial regions.

There is a supplement giving much advice on ionogram research, account being taken of non-standard techniques applicable at particular latitudes or at individual stations, and of detailed rules for routine real-height analysis ; here, the recommendations of the U.R.S.I. meeting of 1961 are included.

In short, therefore, this handbook sets out to treat the problems of ionogram interpretation and reduction in full detail and gives a collection of conventional rules established by the World Wide Soundings Committee. As such, it is unique. Contents : Introduction.

1. Fundamental considerations and definitions.
2. Determination of hourly numerical values.
3. Qualifying and descriptive letters.
4. Es characteristics.
5. The *f* plot.
6. Daily tabulation of hourly values.
7. Monthly tables of data, medians and quartiles.

Supplement : Special Programmes of Work at Ionospheric Sounding Stations.

Introduction :

S 1. Some problems suggested for study at individual stations.

S 2. Electron density height profiles : analysis and parameters.

S 3. Some methods and parameters used in the analysis of ionospheric phenomena.

S 4. Special techniques for use at ionospheric stations.

S 5. Reference material and facilities.

6 × 9″, xii + 192 pages, 16 tables, 88 illustrations, 70 s., Dfl. 35.00, 1961.

Manuel des Stations Ionosphériques — Ionospheric Stations Manual (bilingue bi-lingual).

Le développement des programmes de l'Année Géophysique Internationale, 1957-1958, a mis en évidence la nécessité de publier un répertoire complet des stations ionosphériques, c'est ainsi qu'a été publié, en collaboration entre le Secrétaire Général de l'U.R.S.I. et le Secrétaire de la Commission Mixte de l'Ionosphère, le Manuel des Stations Ionosphériques. La partie principale de ce volume intéresse les stations de sondage à incidence verticale ; une feuille séparée, consacrée à chacune d'elles, donne des renseignements détaillés sur la station ainsi que la table des angles zénitaux solaires. Le manuel contient aussi des renseignements sur les stations effectuant l'observation et la mesure des phénomènes intéressant les recherches sur

l'ionosphère. Pour la facilité des chercheurs des stations ionosphériques l'ouvrage contient les tables des fonctions de Chapman, les phases moyennes de la lune et les nombres des rotations solaires pour 1957-58, le calendrier des Journées Mondiales et des Intervalles Météorologiques de l'A.G.I., etc. Des suppléments pour la mise à jour du Manuel seront envoyés aux souscripteurs.

Ionospheric Stations Manual.

With the development of plans for the International Geophysical Year, 1957-58, the need for publishing a complete gazetteer of ionospheric stations became clear and, with the cooperation of the Secretary General of U.R.S.I. and the Secretary of M.C.I., the Ionospheric Stations Manual has been published.

The main part of the volume is concerned with vertical incidence sounding stations, a separate page being given to each with the detailed information on one side and the table of solar zenith angles on the other. Data on stations carrying out observations and measurements of phenomena connected with ionospheric research have also been given, a series of maps illustrates the distribution of stations. For the convenience of workers at ionospheric stations the following material has also been included : tables of Chapman functions, mean moon phases and solar rotation numbers for 1957-1958, list of vertical incidence scaling symbols, and the I.G.Y. calendar of Regular World Days and World Meteorological Intervals.

To keep the Manual up-to-date periodical supplements will be sent to subscribers.

10 × 11 ½'', 460 pages, 1958, £ 7.5, Dfl. 75.00.

GOLDSCHMIDT MEMORIAL LECTURE

(Abstract from the *I.C.S.U. Review*, Vol. 4, n° 4, October 1962)

The Secretary General of U.R.S.I., Col. E. Herbays, has issued from his office at 7 Place Emile Danco, Uccle-Brussels, an elegant memento of the first Goldschmidt Memorial Lecture, delivered by Dr. Lloyd Berkner in the Institution of Electrical Engineers, London, on September 6, 1960.

The booklet is dedicated « to the founders of U.R.S.I. who at the beginning of this century had faith in the future of the new science using and investigating the electromagnetic waves ». Colonel Herbays contributes a short article entitled « Qu'est-ce que l'U.R.S.I. ? » written with the enthusiasm characteristic of this veteran « I.C.S.U.-man ». Dr. Berkner's lecture « Science in Space » is introduced by Sir Edward Appleton, who justly remarks that « in spite of the range and importance of his many official

responsibilities Admiral Berkner remains at heart a scientific worker ; and many successful enquiries in physical science have had as their start some suggestion from his lively, ranging, and questing mind ».

To receive and possess this beautiful book will be a warming experience to all who have I.C.S.U. and its Unions at heart.

* * *

Copies of this booklet are available at U.R.S.I. General Secretariat upon request.

SERVICES PERMANENTS

I.U.W.D.S.

Issued October 1962 by the International Ursigram and World Days Service under the auspices of U.R.S.I.

1963 JANUARY

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1963 FEBRUARY

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1963 MAY

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1963 AUGUST

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1963 SEPTEMBER

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1963 OCTOBER

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1963 NOVEMBER

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1963 DECEMBER

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1964 JANUARY

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(17) Regular World Day (RWD)

(18) RWD with highest priority

[20] Day of Solar Eclipse

◇24 Rocket-winds Days

7 Day with unusual meteor shower activity

△15 Regular Meteorological Day

16 17 18 19 World Geophysical Interval. (WGI)

CALENDRIER GEOPHYSIQUE INTERNATIONAL 1963

See English text p. 72

1. But. — Le Calendrier Géophysique International indique les journées et intervalles choisis, pendant lesquels une attention particulière est à consacrer aux expériences et analyses géophysiques ; de ce fait il fournit un cadre de coordination à l'échelle mondiale. Il porte principalement sur les domaines de la géophysique relatifs à l'atmosphère terrestre, dans laquelle de nombreux phénomènes accusent des variations importantes dans le courant de l'année. Pour certaines expériences, telles que l'enregistrement des variations du champ magnétique terrestre, les observatoires remplissent des programmes d'observation et d'analyse répartis uniformément sur toute l'année ; dans ces cas-là le Calendrier n'est pas nécessaire. Cependant, pour de nombreuses autres expériences (par exemple, expériences par fusées) il n'est ni pratique, ni intéressant d'exécuter un même programme au jour le jour. Dans ce cas, le Calendrier peut fournir un moyen de coordination utile : les expérimentateurs sauront que leurs collègues, dans d'autres pays, d'autres laboratoires et d'autres disciplines s'efforceront, aux jours et intervalles figurant au Calendrier, de procéder à des expériences. De cette manière, les résultats de ces expériences pourront être comparés ultérieurement avec plus de facilité et d'utilité.

Pour certains domaines scientifiques, les organisations scientifiques internationales ont formulé des recommandations spéciales relatives aux programmes à effectuer pendant les journées et intervalles signalés au Calendrier. Pour d'autres, les arrangements sont non-officiels ou s'imposent d'eux-mêmes. Quelques exemples sont donnés ci-après.

2. Journées Mondiales Régulières (Regular World Days - RWD). — Celles-ci sont destinées aux observations, ou bien aux analyses, ou bien encore aux expériences spéciales qui ne peuvent pratiquement être effectuées que pendant 10 % des journées et doivent être réparties sur toute l'année, par groupes de trois journées consécutives. L'un des jours de chaque groupe est désigné en tant que « RWD » de haute priorité et peut être employé à un travail semblable ne pouvant être entrepris que un seul jour par mois. Voici quelques exemples du domaine de la physique ionosphérique : émission et réception d'impulsions à incidence

oblique ; mesures de l'absorption par la méthode des réflexions d'impulsions ; programme d'observations élargi pour les sifflements et les émissions à très basses fréquences ; analyse d'ionogrammes à incidence verticale par « *f*-plot » et « *h'*-plot », etc. ; réduction horaire d'ionogrammes des paramètres « *hc* » et « *qc* » de la hauteur réelle de la région F. Il est recommandé qu'il soit procédé à l'échange des copies d'ionogrammes originaux pour les sondages à incidence verticale et concernant les jours de haute priorité.

3. Intervalles Géophysiques Mondiaux (World Geophysical Intervals - WGI). — Ils sont consacrés aux expériences qui, pour des raisons d'ordre pratique, ne peuvent être effectuées d'une manière continue, mais pour lesquelles des statistiques des variations saisonnières sont particulièrement nécessaires. Le choix de ces intervalles a été particulièrement influencé par la discipline météorologique. Pour 1963 ces intervalles sont fixés à un mois environ après les équinoxes et solstices qui sont des périodes de changements saisonniers prononcés pour certains phénomènes météorologiques dans la haute atmosphère. Les programmes internationaux coordonnés de météorologie insistent sur l'effort particulier à engager pendant les Intervalles pour les sondages synoptiques par fusées et ballons. D'autres programmes, tels que ceux portant sur les vents ionosphériques et les mesures des vents en haute atmosphère constituent des exemples de programmes pour lesquels les Intervalles sont appropriés.

4. Autres Journées Spéciales. — Elles englobent les journées de mesure des vents par fusées, les journées des éclipses solaires et les journées marquées par une activité inhabituelle des essaims météoriques. Les journées de mesure des vents par fusées (24, 25 et 26 février) ont été choisies par le C.O.S.P.A.R. en vue d'une série de mesures simultanées par fusées des vents de la basse ionosphère (jusqu'à environ 200 km) et par la méthode des grenades, des nuages de sodium et des scintillations visibles de grenades. Le C.O.S.P.A.R. recommande en outre pour ces dates des mesures à partir du sol par les méthodes radio. Les éclipses solaires (25 janvier, 20 juillet 1963, 14 janvier 1964) sont des événements qui permettent de prévoir que des programmes spéciaux seront effectués aux différents points du monde appropriés, pour étudier le Soleil et tout effet que pourrait avoir l'éclipse sur l'atmosphère terrestre. La discipline du géomagnétisme a attiré une attention

particulière sur ces éclipses. Les stations ionosphériques intensifient habituellement leurs programmes d'observations même si, à l'emplacement où elles se trouvent, la magnitude de l'éclipse est peu élevée. De nombreux observatoires procèdent à des observations spéciales de l'activité solaire et publient des rapports spéciaux détaillés pour aider l'interprétation des effets géophysiques. Les journées d'activité inhabituelle des essaims météoriques portent sur certains des essaims météoriques visuels importants, mais aussi sur les essaims inhabituels qui peuvent être observés principalement par radio et par radar. L'attention est attirée sur ces journées pour le cas où l'ionisation produite par les météores pourrait éventuellement expliquer des effets spéciaux dans d'autres expériences géophysiques. La Journée Météorologique Mondiale annuelle fixée par l'O.M.M. au 23 mars (non indiquée au Calendrier) fut célébrée pour la première fois en 1961. Le but de cette Journée est de vulgariser et de faire apprécier par le public de tous les pays les services que les organisations météorologiques nationales peuvent rendre dans les divers domaines du développement économique, ainsi que les activités de l'Organisation Météorologique Mondiale.

5. Journées Mondiales pour les Années Internationales du Soleil Calme 1964-65. — Ce Calendrier comporte aussi le mois de janvier 1964 qui est le premier mois de l'I.Q.S.Y. C'est pourquoi la répartition des journées mondiales est quelque peu différente de celle de 1963 ; ce modèle sera suivi dans l'établissement des Calendriers Géophysiques Internationaux pendant la période de l'I.Q.S.Y. Les Journées Météorologiques Régulières interviennent chaque mercredi (TU) ; il est recommandé d'engager un effort particulier pour obtenir le maximum de données, y compris les lancements de fusées et de sondes pour mesurer la radiation de l'ozone, ainsi que les lancements de ballons à une altitude maximum à 00.00 et 12.00 TU. Les Intervalles Géophysiques Mondiaux ont été étendus pour l'I.Q.S.Y. à 14 jours.

6. Intervalles Spéciaux ne figurant pas au Calendrier. — Les périodes de grandes perturbations magnétiques, aurorales et ionosphériques présentent également un grand intérêt géophysique. Une coordination, à l'échelle mondiale, des observations est particulièrement utile pour les stations qui ne sont pas situées à proximité des zones aurorales et où les observations locales ne permettent

pas de déceler immédiatement le début d'une perturbation majeure. Les avis d'Alertes Géophysiques et d'Intervalles Mondiaux Spéciaux sont régulièrement distribués par télégrammes ou par radio par les Centres Régionaux d'Alertes solaires-géophysiques de l'I.U.W.D.S. et dont les adresses télégraphiques sont les suivantes : AGIWARN WASHINGTON (U. S. A.) ; DEMPA KOKUBUNJI (Japon) ; NIZMIR MOSCOW (U. R. S. S.) ; IONOSPHARE DARMSTADT (R. F. A.) ou GENTELABO PARIS (France) ou AGI NEDERHORSTDENBERG (Pays-Bas). Le réseau de télécommunications météorologique, qui est coordonné par l'O.M.M., transmet ces informations une fois par jour quelque peu après 16.00 TU. Nombreuses sont les stations géophysiques qui augmentent leurs programmes ou qui procèdent à des expériences spéciales pendant ces périodes de perturbations. C'est également par l'intermédiaire des Centres Régionaux d'Alertes que sont notifiés les phénomènes des éruptions solaires, qui entraînent des effets géophysiques importants et, souvent, de longue durée.

7. Le Service International des Ursigrammes et des Journées Mondiales (I.U.W.D.S.) est un service permanent de l'Union Radio Scientifique Internationale (U.R.S.I.) qui est affilié à la Fédération des Services d'Astronomie et de Géophysique du Conseil International des Unions Scientifiques (C.I.U.S.). Ce Calendrier a été établi par A. H. Shapley et J. V. Lincoln, en consultation avec les Unions et les Comités intéressés du C.I.U.S. et les représentants de l'O.M.M. Une description plus détaillée de ces Calendriers a été publiée au *Bulletin d'Information de l'U.R.S.I.* et dans diverses publications scientifiques de large diffusion.

INTERNATIONAL GEOPHYSICAL CALENDAR 1963

1. Purpose. — The International Geophysical Calendar designates selected days and intervals for special attention for geophysical experiments and analysis and is thus a framework for world-wide co-ordination. The Calendar serves mainly the branches of geophysics dealing with the earth's atmosphere in which many phenomena vary significantly during the course of a year. In some experiments, such as the routine recording of variations of the earth's magnetic field, the observing and analysis programs at observatories are normally carried out at a uniform level

throughout the year; in these cases the Calendar is not needed. However, in many other experiments (for example, rocket experiments), it is not practical or meaningful to carry out the same program on each and every day. Here the Calendar can provide a useful mechanism for co-ordination; experimenters will know that their colleagues in other countries, in other laboratories and in other disciplines will tend to also carry out experiments on the days or intervals marked on the Calendar. In this way, results of experiments may later be more easily and usefully compared.

In some scientific fields, international scientific organizations have made specific recommendations for programs to be done on days or intervals marked on the Calendar. In others, the arrangements are informal or self-evident. Some examples are given below.

2. Regular World Days (R.W.D.) are intended for observations or analyses or special experiments which as a practical matter can be done for only about 10 % of days and should be in groups of three consecutive days and spaced throughout the year. One day of each group of three is designated as the « R.W.D. » with highest priority and may be used for similar work which can be undertaken for only one day each month. Examples of suitable programs in Ionospheric Physics are : oblique incidence pulse transmission and reception; absorption measurement by pulse reflection technique; extended observing schedule for whistlers and V.L.F. emissions; analysis of vertical sounding ionograms by *f*-plot, *h'*-plot, etc.; hourly reduction from ionograms of F-region true height parameters « *hc* » and « *qc* ». It is recommended that exchange of copies of original ionograms in ionospheric vertical sounding work be made for the R.W.D. with highest priority.

3. World Geophysical Intervals (W.G.I.) are intended for experiments which for practical reasons cannot be carried on continuously, but for which statistics of seasonal variations are especially needed. The choice of intervals has been heavily influenced by the needs of the meteorology discipline. The intervals in 1963 are placed about a month after the equinoxes and solstices which are times of marked seasonal change in certain upper air meteorological phenomena. The co-ordinated interna-

tional programs for meteorology call for extra effort in synoptic rocket sounding and balloon sounding during the W.G.I. Other programs such as ionospheric drift and high atmosphere wind measurements are other examples of suitable programs for such intervals.

4. Other Special Days marked on the Calendars include rocket-winds days, the days of solar eclipses, and days of unusual meteor shower activity. The rocket-winds days (Feb. 24, 25, 26) have been selected by C.O.S.P.A.R. for a series of simultaneous rocket measurements of winds in the lower ionosphere (up to about 200 km) by techniques such as grenades, sodium clouds and visible grenade glows. C.O.S.P.A.R. further recommends that simultaneous ground-based measurements by radio methods also be made on these dates. The solar eclipses (Jan. 25, July 20, 1963 ; Jan. 14, 1964) are occasions when special programs may be expected to be carried out in appropriate parts of the world to study the sun and any eclipse effects on the earth-atmosphere. The geomagnetism discipline has called special attention to these eclipses. Ionospheric stations customarily increase their observing programs even if the magnitude of eclipse at their location is small. Many solar activity observatories take extra observations and issue specially detailed reports to assist the interpretation of the geophysical effects. The days with unusual meteor shower activity include some of the important visual meteor showers and also unusual showers observable mainly by radio and radar techniques. Attention is called to these days in case ionization produced by meteors may account for unusual effects in other geophysical experiments. The annual World Meteorological Day, selected by the W.M.O. as March 23 (not marked on the Calendar), was first celebrated in 1961. Its purpose is to make the services which national meteorological services can render to the various branches of economic development, as well as the activities of the World Meteorological Organization, better known and appreciated by the public of all countries.

5. World Days for the International Years of the Quiet Sun, 1964-65. — This present Calendar also shows January 1964 which is the first month of I.Q.S.Y. This month therefore shows a pattern of world days which is somewhat different from 1963, but which will be followed in the International Geophysical Calendars for the I.Q.S.Y. period. The Regular Meteorological Days

are each Wednesday (U. T.) on which it is recommended that particular efforts be made to obtain the maximum quantity of data, including rocket ascents and ozone radiation sonde ascents, as well as maximum altitude balloon ascents at 0000 and 1200 U.T. The World Geophysical Intervals for I.Q.S.Y. have been extended to cover 14 days.

6. Special Intervals not appearing on Calendar. — Periods of great magnetic, auroral and ionospheric disturbance are also of considerable geophysical interest. World-wide co-ordination of observation is especially useful for stations not near the auroral zones, that is, places where the beginning of a major disturbance may not be immediately apparent from local observations. Notices of Geophysical Alerts and Special World Intervals (S.W.I.) are distributed by telegram or radio broadcast on a current basis by the solar-geophysical Regional Warning Centers of the I.U.W.D.S., whose telegraphic addresses are as follows :

AGIWARN WASHINGTON (U. S. A.); DEMPA KOKUBUNJI (Japan) ; NIZMIR MOSCOW (U. S. S. R.) ; IONOSPHARE DARMSTADT (G. F. R.) or GENTELABO PARIS (France) or AGI NEDERHORSTDENBERG (Netherlands). The meteorological telecommunications network co-ordinated by W.M.O. carries such information once daily soon after 1600 U.T. Many geophysical stations increase their programs or carry on special experiments during disturbed periods. Prompt notification of immediately significant geophysical observations and of major solar flare events which have important and sometimes long lasting geophysical effects, are also undertaken through the Regional Warning Centers.

7. The International Ursigram and World Days Service (I.U.W.D.S.) is a permanent service of the International Scientific Radio Union (U.R.S.I.), adhering to the Federation of Astronomical and Geophysical Services of the International Council of Scientific Unions (I.C.S.U.). This Calendar has been drawn up by A. H. Shapley and J. V. Lincoln in consultation with interested I.C.S.U. Unions and Committees, and representatives of the W.M.O. A fuller description of such Calendars has appeared in the U.R.S.I. *Information Bulletin* and various widely available scientific publications.

INTER-UNION COMMITTEES

I. U. C. A. F.

List of Documents distributed to members of the Inter-Union Committee (Doc. I. U. C. A. F./40)

Doc. I.U.C.A.F./1-19 : See list given in Doc. I.U.C.A.F./20.

Doc. I.U.C.A.F./21 : « International Space Co-operation » by H. C. van de Hulst : reprinted from Bulletin of the Atomic Scientists Vol. XVII, May-June 1961.

Doc. I.U.C.A.F./22 : « International agreement as a vital factor in Radio Astronomy and Space Research », by H. C. van de Hulst : June 1961.

Doc. I.U.C.A.F./23 : Resolutions Nos. 1 and 2 on certain space experiments including Project West Ford, adopted by the International Astronomical Union, August 1961.

Doc. I.U.C.A.F./24 (revised) : Recommendation from I.U.C.A.F. to the Extraordinary Administrative Radio Conference of 1963.

Doc. I.U.C.A.F./25 : Statement of Functions and Activities of the U. S. Committee on Radio Frequency Allocations for Scientific Research (2nd October, 1961).

Doc. I.U.C.A.F./26 : Report of meeting of the Committee in London, 19th-20th October, 1961.

Doc. I.U.C.A.F./27 (second revision) : Names and addresses of members and consultants of the Committee (September, 1962).

Doc. I.U.C.A.F./28 : Preliminary Views of the United States of America on Frequency Allocations for Space Radiocommunication (September 1961).

Doc. I.U.C.A.F./29 : Circular letter from Committee to National Administrations and Academies of Science (15th January, 1962).

Doc. I.U.C.A.F./30 : Memorandum and Report on Project West Ford from U. S. Space Science Board (March, 1962).

Doc. I.U.C.A.F./31 and 31A : Report of meeting of the Committee in Amsterdam, 11th-12th April, 1962.

Doc. I.U.C.A.F./32 : Report of West Ford Working Party of the United Kingdom Steering Group on Space Research (February 1962).

Doc. I.U.C.A.F./33 : Report of the Committee to the Fourteenth Meeting of the I.C.S.U. Executive Board, Prague, 17th-21st October, 1962.

Doc. I.U.C.A.F./34 : « Radio and Outer Space » by R. L. Smith-Rose : reprinted from Journal of the Institution of Electrical Engineers (London, July 1962).

Doc. I.U.C.A.F./35 : « Protection of the Deuterium Line Frequency for Radio Astronomy » by R. L. Smith-Rose : Report to the European Radio Frequency Agency of N.A.T.O.

Doc. I.U.C.A.F./36 : Draft Reports from U. S. A. to C.C.I.R. Study Group IV (July 1962).

Doc. I.U.C.A.F./37 : Details of Radio Astronomy Observatories in the United States of America.

Doc. I.U.C.A.F./38 : Resolutions adopted by C.O.S.P.A.R. at its Fifth meeting in Washington, May, 1962.

Doc. I.U.C.A.F./39 : « The Protection of Frequencies for Radio Astronomy » by R. L. Smith-Rose. Paper presented at the Fall U.R.S.I.-I.R.E. meeting in Ottawa, 15th October, 1962.

Doc. I.U.C.A.F./41 : Draft Report from U. S. A. to C.C.I.R. on Factors affecting the possibility of frequency sharing by radar astronomy with other services.

Doc. I.U.C.A.F./42 : Memorandum produced by the Secretary General of I.U.C.A.F. in response to a request from M. E. M. Fournier d'Albe for a statement on the work of this Inter-Union Committee to be included in a report from U.N.E.S.C.O. to the forthcoming Administrative Conference of the I.T.U. As the United Nations Specialised Agency, U.N.E.S.C.O. has the responsibility for ensuring that the needs of research workers to have protection of certain bands of frequencies are not overlooked by the Conference.

Letter to all National Members of the I.T.U.

Dear Sir,

I am writing to you on behalf of this Inter-Union Committee which operates as a joint body representing the combined views of the International Scientific Radio Union (U.R.S.I.), the Inter-

national Astronomical Union (I.A.U.), and the International Committee on Space Research (C.O.S.P.A.R.).

You may already be aware that this Inter-Union Committee has the responsibility of promoting the needs of research workers to have adequate protection of certain bands of frequencies used in radio astronomy and space science. With this objective in view, it is important that national administrations should be aware of these needs and so be able to ensure that just consideration should be given to them.

I enclose two appendices :

I. A memorandum outlining the progress made to the present time in the work of this Inter-Union Committee.

II. Two recommendations which it is desired to submit to the forthcoming meeting of the Administrative Council of the I.T.U. in March 1963.

May I appeal to your National Administration to give its support to the two recommendations in II on behalf of the radio astronomers, so that the subject of radioastronomy may be included in the agenda of the Extraordinary Administrative Conference which is planned to meet in October 1963.

We have learnt that the administrations of Canada, China, Denmark, the Federal Republic of Germany, Eire, France, Netherlands, New Zealand, Norway, South Africa, Sweden, Switzerland, the United Kingdom, the United States of America, the United Kingdom Overseas Territories, the United States Territories and the Vatican City State have already indicated that they support these recommendations, and I trust that your administration is prepared also to take similar action.

I understand that it is important that an indication of the attitude of your administration should be sent to the Secretary-General of the I.T.U., if possible not later than 31 December 1962, as requested in the I.T.U. Circular-letter of 29 June, reference : 3607/61/R.

I wish to express in advance the gratitude of my committee for your co-operation, and trust that I may anticipate your support of the request contained in this letter.

29 November, 1962.

Yours faithfully,

R. L. Smith-Rose,

Secretary-General, I.U.C.A.F.

APPENDIX I

Memorandum

It is just thirty years since electromagnetic waves in the radio frequency part of the spectrum were identified as originating in emissions from cosmic sources : and thus was born the science of radio astronomy as a logical development of the much older science of optical astronomy which has relied on the use of the higher frequency — shorter wavelength — part of the spectrum.

More recently, the development of artificial earth satellites for studying the upper regions of the atmosphere and the space beyond have depended upon radio wave techniques for locating the satellites and for receiving the information provided by the measuring instruments in the satellites.

In the past decade or so, the use of radio waves for all purposes such as communication, navigation, broadcasting and television has expanded on an enormous scale, with a consequent increasing pressure for allocations of portions of the radio frequency spectrum. It has therefore become essential for scientists engaged in radio astronomy or space research to establish their claim to the protection of certain bands of frequencies for their use in experimental research.

It was during the General Assembly of the International Scientific Radio Union (U.R.S.I.) in London in 1960, that an Inter-Union Committee was formed to co-ordinate the future requirements of frequency channels for radio astronomy and space science. This Committee consists essentially of four representatives of each of the constituent bodies — U.R.S.I., the International Astronomical Union (I.A.U.), and the International Committee on Space Research (C.O.S.P.A.R.) — with the Secretaries General of these bodies and some consultants who are specially experienced in the international radio field.

This Inter-Union Committee on Frequency Allocations for Radio Astronomy and Space Science, to give it its full title (abbreviated to I.U.C.A.F.), has already been recognised by the International Telecommunication Union (I.T.U.) and its Radio Consultative Committee (C.C.I.R.) as being the appropriate representative body to submit claims for the protection of frequencies used in certain classes of scientific research. Both radio astronomy and

space research are recognised services, and a certain amount of progress has already been made towards ensuring the protection required for such services.

The Inter-Union Committee (I.U.C.A.F.) has had meetings in Brussels, London and Amsterdam ; and is meeting again in Geneva on 28th/29th November, 1962. Furthermore, the Chairman, Dr. J. F. Denisse, and the Secretary-General, Dr. R. L. Smith-Rose, attended a meeting of the relevant study group of C.C.I.R. in Washington in March 1962 ; and they will also represent the Committee at the forthcoming Plenary Assembly of C.C.I.R. at New Delhi in January-February 1963. It is likely that other members of the Committee, in particular Dr. H. Sterky (Sweden) and Dr. A. P. Mitra (India), will also attend the C.C.I.R. assembly.

While the Radio Regulations drawn up by I.T.U. in 1959, give an exclusive allocation of the band 1400-1427 Mc/s (the hydrogen line) to radio astronomy, other bands of naturally occurring radiation are admitted only on a shared basis with other services. Efforts are being made to improve the position by seeking better protection for these, and also for a series of 10 or 12 bands of frequencies distributed throughout the spectrum. At the European Broadcasting Conference at Stockholm in 1961, representations from the Committee (I.U.C.A.F.) were successful in obtaining agreement that no major television broadcasting station should be planned to operate in Europe in the band 606-614 Mc/s, so that this might be kept freely available for the radio astronomy service.

The use of radio waves by the space scientist requires similar protection. Many satellites in orbit round the earth are being used to extend our knowledge of the upper atmosphere, at heights well above the ionosphere, and to measure various physical quantities in outer space, such as solar radiation, cosmic rays, and the density and orbits of electrons trapped in belts determined by the earth's magnetic field. At the 1959 Conference of I.T.U., some dozen frequencies were allocated for research purposes, but all except three of these are on a secondary basis shared with other radio services as the primary users. One band — 136-137 Mc/s — was recommended as a primary service for the tracking of space vehicles ; and steps have already been taken in various countries to clear this band of other users.

Experiments to be conducted in the future with other satellites are in an advanced stage of development : and similarly radio astronomers are preparing to extend the scope of their research into cosmic phenomena with the aid of improved techniques, and more sensitive and precise radio equipment. It is therefore most important that the research workers involved should be encouraged and supported by being given the utmost protection from interference in the use of the radio frequency bands assigned to these sciences. The Inter-Union Committee earnestly seeks the support of all national Administrations, who as participants in the work of C.C.I.R. and I.T.U., will determine the manner in which the relevant portions of the radio frequency spectrum are assigned to radio astronomy and space science, amidst the claims of all other radio services. The scientific research of today and the next few years will determine the trend and extent of man's developments in outer space in the immediate and more distant future.

30th November, 1962.

APPENDIX II

Recommendations I and II adopted at the I.U.C.A.F. Meeting in Amsterdam on April 12, 1962. See *Information Bulletin*, nº 132, p. 39.

C. C. I. R.

X^e Assemblée Plénière

APERCU GENERAL SUR LE PROGRAMME DE L'ASSEMBLEE

(Extrait du *Journal des Télécommunications*, vol. 29, n° 12, décembre 1962)

Décisions importantes

Pour la seconde fois, une Assemblée plénière du C.C.I.R. s'occupera activement d'un problème récent, celui des communications spatiales. Elle se prononcera non seulement sur les projets préparés à Washington en mars 1962, par la réunion intérimaire de sa Commission d'études chargée des communications spatiales, mais elle étudiera également quelques dizaines de contributions nouvelles. Elle constituera ainsi une sorte de conférence technique préparatoire à la Conférence administrative extraordinaire des radiocommunications qui, en octobre 1963, à Genève, traitera de problèmes administratifs et techniques tels que l'attribution des bandes de fréquences pour le service spatial.

Dans d'autres domaines du C.C.I.R., on s'attend également à des décisions importantes. En ce qui concerne les émetteurs, l'Assemblée plénière se prononcera, entre autres, sur les valeurs des rayonnements non désirés et sur des valeurs nouvelles des tolérances de fréquences ; dans le domaine des récepteurs, elle abordera pour la première fois la question des récepteurs typiques pour les divers services.

Les problèmes posés par les services fixes feront l'objet de discussions approfondies sur l'application des dispositifs de mise en phase automatique dans les systèmes à correction automatique des erreurs. L'étude des émissions à bande latérale unique sera également poursuivie activement.

Dr. E. METZLER,
Directeur du C.C.I.R.

C. C. I. R.

Xth Plenary Assembly

GENERAL VIEW ON THE PROGRAMME

(Reprint from the *Telecommunication Journal*, vol. 29, n° 12, December 1962)

Important decisions

For the second time, a Plenary Assembly of the International Radio Consultative Committee will actively be considering a new problem, that of space communications. Besides deciding on the plans prepared in Washington in March 1962, at the interim meeting of Study Group IV (space communications problems), it will have to consider some dozens of new papers on this subject. It will thus constitute a kind of preliminary technical conference prior to the Extraordinary Administrative Radio Conference, which, meeting in Geneva in October 1963, will deal with administrative and technical problems, such as the question of frequency allocation for space communication.

In other fields, too, major decisions are likely to be taken. As regards transmitters, the Plenary Assembly will decide on tolerable spurious radiation levels and on new frequency tolerances. For the first time, it will tackle the problem of typical receivers for the various services.

In connection with the fixed services, there will be considerable discussion about the use of automatic phasing devices in automatic error-correction systems. And the study of single-sideband systems will be actively pursued.

Dr. E. METZLER,
Director of the C.C.I.R.

A. G. I.

Observations Ionosphériques

Le Centre National de la Recherche Scientifique (C.N.R.S.) de France a publié dans la série de l'Année Géophysique Internationale les Monographies ci-après sur les observations ionosphériques françaises :

SÉRIE V :

Fascicule 4. — Station de Dumont d'Urville (Terre Adélie), de juillet 1957 à décembre 1958 et de Port-aux-Français (Kerguelen) de janvier 1957 à décembre 1958.

Fascicule 6. — Bangui, de février 1958 à février 1959 ; Djibouti, de juillet 1957 à décembre 1958 ; Dakar de, juillet 1957 à décembre 1958.

Fascicule 7. — Poitiers, de juillet 1957 à décembre 1958 ; Casablanca, de juillet 1957 à janvier 1958 ; Rabat, de février à décembre 1958.

I. G. Y.

Ionospheric Data

The I.G.Y. World Data Center A, Airglow and Ionosphere C.R.P.L., NBS, Boulder (Col.) has issued the « Tenth 6 — Monthly Catalogue of Data ». It contains the data received during the period 1 July 1957 - 30 June 1962.

CONSEIL INTERNATIONAL DES UNIONS SCIENTIFIQUES (C. I. U. S.)

Résolutions adoptées par la XIVe Réunion du Comité Exécutif

See English text p. 96

Seules les résolutions générales et celles intéressant les activités de l'U.R.S.I. sont reproduites.

POINT 1. — OUVERTURE DE LA SESSION.

Résolution EB (XIV) 1.

Le Comité exécutif,

reconnaissant l'urgence créée par le décès du Dr Steacie, Président du C.I.U.S.,

enregistre la décision prise par le Bureau de confier à un des Vice-Présidents, le Dr. Horstadius, l'autorité et les responsabilités conférées au Président selon les statuts, et

recommande que des démarches soient entreprises en vue de l'élection du Président, au besoin par vote par correspondance.

POINT 4. — FINANCES.

Résolution EB (XIV) 2.

Le Comité exécutif,

recommande qu'aucun nouveau projet ne soit accepté avant que toutes les implications financières n'en aient été considérées.

Résolution EB (XIV) 3.

Le Comité exécutif,

décide que

a) le Fonds Spécial du C.I.U.S. (I.C.S.U. Special Fund) sera utilisé aux fins de dons et subventions à de nouveaux projets scientifiques acceptés par le Comité exécutif ;

b) le Fonds de Roulement (Working Capital Fund) sera utilisé aux fins suivantes :

(i) avances aux organismes du C.I.U.S. n'ayant pas encore perçu leurs subventions, allocations ou souscriptions ;

(ii) prêts aux nouveaux projets scientifiques du Conseil, ces prêts devant être remboursés dans des délais fixés par le Bureau sur avis du Trésorier.

Résolution EB (XIV) 4.

Le Comité exécutif,

décide que pour une période d'essai de deux ans, à partir de 1964, la subvention de l'U.N.E.S.C.O. sera distribuée d'après un pourcentage préétabli et sous réserve de l'accord de l'U.N.E.S.C.O.

Résolution EB (XIV) 5.

Le Comité exécutif,

approuve les décisions du Trésorier concernant les donations suivantes du Fonds spécial en 1962 :

a) Programme biologique international (I.B.P.) ..... $ 10.000

b) Comité de l'Année internationale du Soleil calme (I.Q.S.Y.) 5.000

c) Comité scientifique de Recherche Antarctique (S.C.A.R.) 1.500

Résolution EB (XIV) 6.

Le Comité exécutif,

approuve l'allocation de $ 7.000 en 1962 au Fonds de « *I.C.S.U. Review* ».

Résolution EB (XIV) 7.

Le Comité exécutif,

adopte la distribution de la subvention U.N.E.S.C.O. telle qu'elle est proposée pour 1963 par le Sous-Comité des allocations.

Résolution EB (XIV) 8.

Le Comité exécutif,

approuve les prévisions budgétaires pour les organisations subsidiées par le C.I.U.S. selon la recommandation du Comité des Finances.

Résolution EB (XIV) 9.

Le Comité exécutif,

adopte le nouveau règlement concernant les voyages et les indemnités, tel qu'il est présenté par les dirigeants du Bureau.

Résolution EB (XIV) 11.

Le Comité exécutif,

approuve les propositions du Comité des Finances relatives aux accroissements d'aide financière qui sont consentis aux organismes ci-après, en admettant que les subventions supplémentaires promises au C.I.U.S. seront accordées :

S.C.O.R.	$ 5.000
C.I.G.	3.000
I.Q.S.Y.	1.000
I.B.P.	17.000
Manteau supérieur	8.000
I.A.B.	5.000
Centre international d'Analyse Antarctique	10.000
J.C.A.R.	4.000
Comité mixte O.M.M./C.I.U.S.	2.000
C.I.E.S.	3.000
Comité inter-unions de Géochimie	3.000
Comité inter-unions de l'Ionosphère	2.000
Total	63.000

POINT 6. — COMITÉS SCIENTIFIQUES ET SPÉCIAUX.

Résolution EB (XIV) 12.

Le Comité exécutif,

notant avec satisfaction les mérites tant des membres de Comités ou de Commissions que des dirigeants et des représentants d'Unions participant au travail scientifique important et de haute qualité, accompli généralement par les Comités et Commissions en cause ;

estime qu'en général ces résultats justifient a posteriori la constitution des dits Comités ou Commissions et, en particulier,

juge que :

a) les statuts des Commissions mixtes existantes ne doivent pas être changés ;

b) qu'il en va de même pour les Comités scientifiques S.C.A.R. et C.O.S.P.A.R.

Résolution EB (XIV) 13.

Le Comité exécutif.

considère que la création de nouveaux Comités ou Commissions ne doit être envisagée qu'après une étude approfondie montrant qu'aucune autre solution satisfaisante ne peut y suppléer et que l'objet en est d'importance suffisante eu égard au développement de la coopération scientifique internationale et interdisciplinaire, et pour le progrès des disciplines scientifiques en cause ;

recommande en conséquence qu'une telle création devrait être approuvée par une Assemblée Générale du C.I.U.S. après avoir été acceptée par le Comité exécutif à la suite d'une consultation des Unions et des Membres nationaux du C.I.U.S.

Résolution EB (XIV) 14.

Le Comité exécutif,

considère que :

a) la formation éventuelle d'organismes nouveaux et l'évolution des Comités et Commissions existants devraient être suivies par le C.I.U.S. et examinées lors de chaque Assemblée Générale du C.I.U.S. ;

b) le Bureau du C.I.U.S. devrait être représenté, avec voix consultative, par un de ses membres à toute Assemblée plénière de tout Comité ou de toute Commission du C.I.U.S. ;

recommande que le développement des Comités et Commissions tende à alléger les charges financières initiales du C.I.U.S. et que, lorsque leur activité devient un travail de routine qui relève davantage d'organismes nationaux disposant d'un équipement adéquat que d'un organisme du C.I.U.S., le transfert de ces tâches à un organisme intergouvernemental approprié soit étudié, préparé et effectué ;

estime hautement souhaitab'e qu'une pareille évolution, affranchissant le C.I.U.S. de charges financières qui ne concernent plus directement l'encouragement à la recherche scientifique par la coopération internationale et interdisciplinaire, ne provoque en aucun cas la rupture sur le plan scientifique des liens de filiation entre le C.I.U.S. et les Comités ou Commissions devenus financièrement indépendants.

Résolution EB (XIV) 15.

Le Comité exécutif,

recommande que le C.I.U.S. favorise l'établissement de relations étroites entre les Comités spéciaux et scientifiques du C.I.U.S. et les organisations à caractère intergouvernemental intervenant dans le même domaine, en maintenant toutefois une stricte indépendance à l'égard de ces organisations, en même temps que le caractère exclusivement scientifique de l'activité du C.I.U.S. et de ses Comités et Commissions.

Résolution EB (XIV) 16.

Le Comité exécutif,

recommande qu'afin d'éviter toute duplication d'efforts entre les Unions d'une part, les Comités ou Commissions d'autre part, les uns et les autres assurent soigneusement la coopération des Unions dans la préparation des réunions scientifiques que les Comités ou Commissions peuvent organiser, étant donné que cette coopération est le but recherché de toute activité scientifique interdisciplinaire et que la représentation des Unions participantes en fournit le moyen direct et aisé.

Point 7. — Comité de la Structure future du C.I.U.S.

Résolution EB (XIV) 17.

Le Comité exécutif,

exprimant ses commentaires concernant le rapport distribué relatif à la structure future du C.I.U.S. ;

demande que ces commentaires soient transmis au Comité de la Structure future du C.I.U.S. ; et

décide d'autoriser les dépenses nécessaires à la réunion d'une Assemblée Générale extraordinaire, conformément à la décision de la 9e Assemblée Générale de Londres, c'est-à-dire au minimum douze mois après que le rapport complet du Comité ait été distribué à toutes les Unions et à tous les Membres nationaux, et aussitôt que le Bureau le jugera possible après cette date.

POINT 8. — RÉSOLUTION 1721 (*XVI*) DES NATIONS UNIES.

Résolution EB (XIV) 18.

Le Comité exécutif,

ayant pris connaissance des résolutions 27 et 28/EC-XIV de l'O.M.M. sur les recherches et les applications météorologiques rendues possibles par les satellites artificiels ;

note qu'en attendant l'établissement éventuel, l'an prochain, par le 4e Congrès de l'O.M.M., d'un Comité consultatif de la recherche scientifique en météorologie à l'aide de satellite artificiels, le Comité exécutif de l'O.M.M. a décidé d'établir un groupe de travail chargé de remplir temporairement certaines fonctions du Comité consultatif ;

note également que ce groupe de travail serait composé de douze membres : 7 représentants de l'O.M.M., 4 du C.I.U.S. et 1 de l'U.N.E.S.C.O. ;

constate avec une très vive satisfaction que le Comité exécutif de l'O.M.M. a désigné des membres qui par leurs fonctions ou par leurs activités à l'U.G.G.I. et au C.O.S.P.A.R. peuvent fort bien défendre à la fois les intérêts du C.I.U.S. et de l'O.M.M.

Le fait qu'un tel choix ait pu être fait prouve qu'il eût été possible de désigner les membres du groupe de travail d'un commun accord entre les deux organisations ;

souhaite que le 4e Congrès de l'O.M.M. examine la Résolution 27/EC-XIV dans l'esprit de l'accord de travail O.M.M.-C.I.U.S. et établisse le Comité consultatif en étroite coopération avec le C.I.U.S.

En particulier, le Conseil serait heureux que le choix des membres de ce Comité consultatif se fasse d'un commun accord entre deux organisations. Dans cet ordre d'idée, il faut espérer que les membres de ce Comité travailleront non pas tant comme représentants de l'une ou de l'autre des deux organisations, mais bien plus à titre individuel, en leur capacité d'hommes de science ;

En attendant la décision finale du 4e Congrès de l'O.M.M. et dans un esprit de coopération, après consultation de l'Association Internationale de Météorologie et de Physique de l'Atmosphère et de l'Association Internationale de Géomagnétisme et d'Aéronomie de l'U.G.G.I., de l'U.R.S.I. et du C.O.S.P.A.R.,

désigne les membres suivants pour représenter le C.I.U.S. au sein du groupe de travail temporaire : MM. Dieminger, Godson, Kondratjev, Petterssen, Van Mieghem ;

estime que seuls les points a (i) à a (vi) de l'appendice du premier rapport de l'O.M.M. sont de la compétence de C.I.U.S. et enfin

confie la liaison I.C.S.U.-I.T.U. au Comité inter-unions des Allocations de Fréquences.

POINT 9. — PROGRAMME BIOLOGIQUE INTERNATIONAL.

POINT 10. — ANNÉE INTERNATIONALE DU SOLEIL CALME (I.Q.S.Y.).

Résolution EB (XIV) 21.

Le Comité exécutif,

a pris note avec satisfaction de l'action déjà entreprise par le C.I.G. en vue de créer un Comité et un Secrétariat pour l'I.Q.S.Y. ;

désire encourager le travail de ce Comité et est disposé à verser une subvention annuelle de $ 5.000 à l'I.Q.S.Y. et à consentir un prêt de $ 5.000, pour dépenses de premier établissement, à prélever sur le Fonds Spécial du C.I.U.S. ;

apprécie l'opportunité du projet de règlement proposé par le Comité de l'I.Q.S.Y. et

reconnait qu'il est conforme aux règles du C.I.U.S. concernant les Comités spéciaux, mais

n'envisage pas favorablement la création d'un Comité spécial du C.I.U.S. pour l'I.Q.S.Y. ;

reconnaissant les liens essentiels du Comité de l'I.Q.S.Y. avec les responsabilités plus larges du C.I.G. ;

demande au C.I.G. de continuer à considérer le programme de l'I.Q.S.Y. comme l'une de ses activités principales et au cours de la période de 5 ans prenant fin le 1er août 1967 de s'efforcer d'aider le Comité de l'I.Q.S.Y. à réaliser ce programme avec succès.

Point 11. — Programme hydrologique international.

Point 12. — Comité International de Géophysique.

Résolution EB (XIV) 23.

Le Comité exécutif,

confirme la recommandation prise à la 9e Assemblée Générale de transférer la responsabilité du Lever magnétique mondial et du Projet du Manteau supérieur à l'Union Internationale de Géodésie et Géophysique.

Point 13. — S.C.O.R.

Point 14. — S.C.A.R.

Résolution EB (XIV) 26.

Le Comité exécutif,

tenant compte de la demande de la 7e réunion de S.C.A.R. d'établir un fonds spécial du C.I.U.S. pour permettre de recruter du personnel pour l'International Antarctic Analysis Centre,

reconnait que ce centre est d'une importance primordiale pour la recherche en météorologie.

approuve la création d'un fonds spécial du C.I.U.S. pour l'International Antarctic Analysis Centre.

Point 15. — C.O.S.P.A.R.

Voir Résolution EB (XIV), 27, dernier paragraphe.

Point 16. — Contamination de l'espace extra-atmosphérique.

Résolution EB (XIV) 27.

Le Comité exécutif,

note que certaines expériences, essais et opérations à l'aide de fusées, satellites et véhicules spatiaux peuvent introduire dans l'espace et l'atmosphère des substances pouvant avoir des effets nuisibles aux observations scientifiques futures et pouvant changer l'état naturel et les propriétés naturelles de l'atmosphère ;

attire particulièrement *l'attention* de ceux qui envisagent toute expérience pouvant contaminer ou perturber l'atmosphère extra-terrestre, sur l'accumulation possible de substances nocives et sur les effets nuisibles qui pourraient résulter d'essais fréquemment répétés ;

insiste auprès de tous les gouvernements intéressés pour qu'ils prennent, avant de les entreprendre, les conseils de savants compétents sur les effets possibles de ces expériences, de ces essais ou de ces opérations ;

demande au C.O.S.P.A.R. de lui communiquer les conclusions auxquelles parviendra son groupe consultatif pour les expériences dans l'espace pouvant avoir des effets nocifs.

POINT 19. — COMMISSION MIXTE POUR L'ENSEIGNEMENT DES SCIENCES.

POINT 20. — COMMISSION MIXTE DE RADIOACTIVITÉ APPLIQUÉE.

POINT 22. — UNIONS ET ASSOCIATIONS DEMANDANT A ETRE AFFILIÉES AU C.I.U.S.

Résolution EB (XIV) 30.

Le Comité exécutif,

considérant le rapport du Groupe de travail établi au cours de la 14e réunion du Comité exécutif pour étudier le problème des Unions et des Associations qui demandent à être affiliées au C.I.U.S., et la possibilité de grouper les Unions par grands domaines de la connaissance,

décide de transmettre au Comité de la Structure future du C.I.U.S. les opinions exprimées par les délégués.

POINT 23. — VOTES PAR CORRESPONDANCE.

Résolution EB (XIV) 31.

Le Comité exécutif,

décide que :

1) le scrutin par correspondance ne doit être utilisé que lorsqu'il est absolument nécessaire ;

2) le vote ne sera valide que si la procédure est approuvée par 2/3 des Membres du Comité exécutif (soit actuellement 20 voix) ;
3) la motion ne sera adoptée que si elle a recueilli la majorité simple des Membres du Comité exécutif (soit à présent 16 voix) ;
4) au cas où une des Unions n'a pas désigné son représentant au Comité, les circulaires relatives au vote seront adressées au Secrétaire général.

POINT 25. — ANNUAIRE.

Résolution EB (XIV) 32.

Le Comité exécutif,

décide de ne pas inclure de notices biographiques dans l'annuaire du C.I.U.S. pour le moment.

POINT 26. — I.C.S.U. REVIEW.

POINT 30. — RELATIONS AVEC L'U.N.E.S.C.O.

Résolution EB (XIV) 34.

Le Comité exécutif,

recommande que le Secrétaire Général envoie une note à tous les Membres nationaux insistant sur la nécessité de s'assurer que les délégations nationales à la Conférence générale de l'U.N.E.S.C.O. ainsi qu'aux Commissions scientifiques comprennent des personnalités scientifiques connaissant bien le rôle et les activités du C.I.U.S. et des diverses Unions scientifiques internationales membres du C.I.U.S., afin que les intérêts de la science soient défendus efficacement, aux niveaux national et international, lorsque les questions relatives aux subventions pour la recherche scientifique sont discutées à la Conférence générale de l'U.N.E.S.C.O.

POINT 31. — RELATIONS AVEC D'AUTRES ORGANISATIONS INTERNATIONALES.

POINT 33. — COMITÉ DES SCIENCES DE L'ATMOSPHÈRE ET DE L'HYDROLOGIE.

Résolution EB (XIV) 36.

Le Comité exécutif,

considérant avec un vif intérêt la recommandation suivante, présentée par le Président de la National Academy of Sciences des

Etats-Unis avec l'accord officiel de l'organisme directeur de la National Academy of Sciences, National Research Council :

Le C.I.U.S. sera prié d'établir un Comité spécial des Sciences de l'Atmosphère et de l'Hydrologie qui sera chargé de :

1) étudier et favoriser les programmes internationaux de recherches, et
2) formuler des avis, si la demande leur en est faite, aux organisations intergouvernementales ayant des responsabilités internationales dans ces domaines ;

transmet cette question au Comité exécutif de l'U.G.G.I. pour étude détaillée en consultation avec les autres Unions et pour présentation d'une recommandation au C.I.U.S. ;

rappelle à ce sujet sa décision antérieure concernant la Résolution 1721 (XVI) des Nations Unies et sur le Programme hydrologique international.

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS (I. C. S. U.)

Resolutions adopted by the Fourteenth Meeting of the Executive Board

Only resolutions of general interest or interesting U.R.S.I. activities are reproduced.

ITEM 1. — OPENING OF THE MEETING.

Resolution EB (XIV) 1.

The Executive Board,

recognizing the emergency created by the sudden death of Dr. Steacie, President of I.C.S.U.,

appreciated the action taken by the Bureau in having one of the Vice-Presidents, Dr. Horstadius, assume all the powers and responsibilities attached to the office of President as provided for in the Statutes, and

recommended that steps be taken to conduct the election of the President, if necessary, by vote by correspondence.

ITEM 4. — FINANCES.

Resolution EB (XIV) 2.

The Executive Board,

recommended that no new project be endorsed without prior consideration of all the financial implications.

Resolution EB (XIV) 3.

The Executive Board,

decided that :

(*a*) the I.C.S.U. Special Fund would be used to make gifts or donations to new scientific projects accepted by the Executive Board ;

(*b*) the Working Capital Fund would be used for the following purposes :

(i) to make advances to I.C.S.U. bodies pending the receipt of expected subventions, grants or subscriptions ;

(ii) to make loans to new scientific projects of the Council, such loans to be repaid over a period to be determined by the Bureau, following the advice of the Treasurer.

Resolution EB (XIV) 4.

The Executive Board,

decided that for a trial period of two years, commencing in 1964, the Unesco subvention be distributed on a percentage basis, provided it is approved by U.N.E.S.C.O.

Resolution EB (XIV) 5.

The Executive Board,

ratified the decisions of the Treasurer in making the following loans from the I.C.S.U. Special Fund in 1962 :

(*a*) to the International Biological Programme (I.B.P.) .. $ 10.000

(*b*) to the Committee for the International Quiet Sun Year (I.Q.S.Y.) 5.000

(*c*) to the Scientific Committee on Antarctic Research (S.C.A.R.) 1.500

Resolution EB (XIV) 6.

The Executive Board,

approved the allocation of $ 7.000 in 1962 to the *I.C.S.U.* Review Fund.

Resolution EB (XIV) 7.

The Executive Board,

adopted the proposed distribution of the U.N.E.S.C.O. subvention for 1963, as recommended by the Allocations Sub-Committee.

Resolution EB (XIV) 8.

The Executive Board,

accepted the Budget Estimates for subsidiary organizations of I.C.S.U. following the recommendation of the Finance Committee.

Resolution EB (XIV) 9.

The Executive Board,

adopted the new regulations for travel and subsistence as presented by the Officers.

Resolution EB (XIV) 11.

The Executive Board,

endorsed the proposals of the Finance Committee that in the assumption that anticipated additional subventions and grants are forthcoming, the following bodies should receive additional support in 1963 :

S.C.O.R.	$ 5.000
C.I.G.	3.000
I.Q.S.Y.	1.000
I.B.P.	17.000
Upper Mantle Project	8.000
I.A.B.	5.000
International Antarctic Analysis Centre	10.000
I.C.A.R.	4.000
W.M.O./I.C.S.U. Committee on Outer Space Research	2.000
Inter-Union Committee on Science Teaching	3.000
Inter-Union Committee on Geochemistry	3.000
Inter-Union Committee on the Ionosphere	2.000
Total	63.000

ITEM 6. — I.C.S.U. SPECIAL AND SCIENTIFIC COMMITTEES.

Resolution EB (XIV) 12.

The Executive Board,

noting with appreciation the value both of the members of Committees or Commissions and of the officers and representatives of participating Unions in the important scientific work of high quality, generally accomplished by the said Committees and Commissions ;

was convinced that, in general, these results justify, a posteriori, the constitution of these Committees and Commissions and, in particular,

believed that :

(*a*) the statutes of the Joint Commissions in existence did not require modification ;

(*b*) no modification is needed in the statutes of the Scientific Committees S.C.A.R. and C.O.S.P.A.R.

Resolution EB (XIV) 13.

The Executive Board,

considered that the creation of new Committees or Commissions should not be envisaged without a thorough preliminary study proving that no other satisfactory solution exists, and that the target is sufficiently important to the development of international and interdisciplinary scientific co-operation and to the progress of the scientific disciplines involved ;

recommended consequently that such a creation should first be accepted by the Executive Board after consultation with the Unions and National Members of I.C.S.U. and then approved by the General Assembly of I.C.S.U.

Resolution EB (XIV) 14.

The Executive Board,

considered that :

(*a*) the possible formation of new organisms and the evolution of existing Committees or Commissions should be followed by I.C.S.U. and examined at each I.C.S.U. General Assembly,

(*b*) the Bureau of I.C.S.U. should be represented, with a consultative voice, by one of its members at any Plenary Assembly of every Committee or Commission of I.C.S.U. ;

recommended that the evolution of Committees and Commissions should tend to lighten the initial financial burden of I.C.S.U., and that, when the development of their tasks lead to routine procedures more relevant to adequately equipped national organisms than to an I.C.S.U. body, the transfer of these tasks to an appropriate intergovernmental body be studied, prepared and carried out ;

emphasized that such an evolution, discharging I.C.S.U. of a financial burden which no longer concerns directly the promotion

of science by international or interdisciplinary co-operation, should in no case be a cause for a rupture on the scientific level of the filiation links between I.C.S.U. and Committees or Commissions becoming financially independent.

Resolution EB (XIV) 15.

The Executive Board,

recommended that I.C.S.U. should favour the establishment of good relations between Special and Scientific Committees of I.C.S.U. and the intergovernmental organisations working in the same field, while maintaining a strict independence in regard to these organisations, as well as the exclusively scientific character of the activities of I.C.S.U. and its Committees and Commissions.

Resolution EB (XIV) 16.

The Executive Board,

recommended that the Committees and Commissions when preparing scientific meetings should fully exploit the co-operation of the Unions, since this co-operation is the aim pursued by an interdisciplinary scientific activity and since the representation of participating Unions is an easy and direct way of its implementation, and should thus avoid any duplication of efforts between Unions and Committees or Commissions.

ITEM 7. — COMMITTEE FOR THE FUTURE STRUCTURE OF I.C.S.U.

Resolution EB (XIV) 17.

The Executive Board,

expressed its initial reactions to the first report on I.C.S.U. future structure already circulated ;

requested that they be conveyed to the Committee for the Future Structure of I.C.S.U. ; and

resolved that the necessary expenditure be authorized for the convention of an extraordinary General Assembly in accordance with the decision of the 9th General Assembly (London), i.e. not earlier than twelve months after a complete report of the Committee had been circulated among all the Unions and the National Members, and as soon thereafter as the Bureau thought it feasible.

ITEM 8. — UNITED NATIONS RESOLUTION 1721 (XVI).

Resolution EB (XIV) 18.

The Executive Board,

having considered the resolutions 27 and 28 (EC XIV) of W.M.O. on research aspects and applications of meteorological satellites ;

noted that, pending the possible establishment by the 4th Congress of W.M.O. next year of an Advisory Committee on Scientific Research in Meteorology with Artificial Satellites, the Executive Committee of W.M.O. decided to set up a Working Group to fulfil temporarily some of the functions of the Advisory Committee ;

noted also that this Working Group will consist of 12 members : 7 representatives of W.M.O., 4 of I.C.S.U. and 1 of U.N.E.S.C.O. ;

noted with great satisfaction that the Executive Committee of W.M.O. has nominated members whose functions or activities in I.U.G.G. or C.O.S.P.A.R. enable them to speak at the same time for I.C.S.U. and for W.M.O., that such a selection was possible shows that the members of the Working Group could have been chosen by consultation between the two organizations ;

wished that the 4th Congress of W.M.O. examine the resolution 27 (EC XIV) in the spirit of the working agreement between W.M.O. and I.C.S.U. and set up the Advisory Committee in close co-operation with I.C.S.U. ;

would particularly appreciate that the members of the Advisory Committee be selected by consultation between the two organizations ;

hoped that the members of the Committee would work not so much as representatives of either organization than as individuals, in their capacity of scientists ;

pending final decision of the 4th Congress of W.M.O. and in a spirit of co-operation, after consultation with the International Associations of Meteorology and Atmospheric Physics and of Geomagnetism and Aeronomy of I.U.G.G., with U.R.S.I. and C.O.S.P.A.R.,

designated the following members to represent I.C.S.U. on the temporary Working Group :

Professor W. Dieminger, Dr. W. L. Godson, Professor L. Kondratiev, Professor Sv. Petterssen, Professor J. Van Mieghem ;

thought that only points a (i) to a (vi) of the appendix to the First Report of W.M.O. are within I.C.S.U.'s competence ; finally

entrusted the liaison between I.C.S.U. and the International Telecommunication Union to the Inter-Union Committee on Frequency Allocations.

ITEM 9. — INTERNATIONAL BIOLOGICAL PROGRAMME.

ITEM 10. — INTERNATIONAL YEAR OF THE QUIET SUN (I.Q.S.Y.).

Resolution EB (XIV) 21.

The Executive Board,

noted with satisfaction the action taken by C.I.G. in establishing a Committee and a Secretariat for I.Q.S.Y. ;

decided to encourage the work of the Committee by making a loan of $ 5.000 from the I.C.S.U. Special Fund towards its initial expenses and an annual contribution of $ 5.000 for five years to the I.Q.S.Y. funds ;

appreciated the suitability of the draft rules proposed for the I.Q.S.Y. Committee and

recognized that they are based on I.C.S.U. rules for Special Committees, but

was not in favour of the creation of an I.C.S.U. Special Committee for I.Q.S.Y. ;

recognizing the essential links of the I.Q.S.Y. Committee to the broader responsibilities of the C.I.G.,

requested the C.I.G. to continue to regard the I.Q.S.Y. programme as one of its principal activities and during the period of 5 years ending 1 August 1967 to take all appropriate steps to support its I.Q.S.Y. Committee so as to achieve the successful accomplishment of the I.Q.S.Y. programme.

ITEM 11. — INTERNATIONAL HYDROLOGICAL PROGRAMME.

ITEM 12. — COMITÉ INTERNATIONAL DE GÉOPHYSIQUE.

Resolution EB (XIV) 23.

The Executive Board,

confirmed the recommendation made at the 9th General Assembly that the responsibility of the World Magnetic Survey and of the Upper Mantle Project should be transferred to the I.U.G.G.

ITEM 13. — S.C.O.R.

ITEM 14. — S.C.A.R.

Resolution EB (XIV) 26.

The Executive Board,

taking into account the request of the 7th S.C.A.R. meeting that I.C.S.U. set up a special fund to assist in staffing the International Antarctic Analysis Centre,

noting that this centre is of primary value to research,
approved the creation of an I.C.S.U. Special Fund for the International Antarctic Research Centre.

ITEM 15. — C.O.S.P.A.R.

See Resolution EB (XIV) 27 last paragraph.

ITEM 16. — CONTAMINATION OF OUTER SPACE.

Resolution EB (XIV) 27.

The Executive Board,

noted that some experiments, tests and operations with rockets, satellites and space vehicles can introduce into space and into the atmosphere materials which may have harmful effects upon scientific observations in the future and also may change the natural state and behaviour of the atmosphere ;

called particularly the attention of those planning any experiment that may contaminate or perturb the Earth's environment, to the possible accumulation of undesirable material and effects as a result of many repeated tests ;

appealed to all Governments conducting operations, tests and experiments in outer-space to obtain the advice of experienced scientists on the possible results of these operations, tests or experiments before conducting them, and to exercise due caution in dangerous or questionable circumstances ;

requested C.O.S.P.A.R. to keep the Board informed of the findings of its « Consultative Group on Potentially Harmful Effects of Space Experiments ».

ITEM 19. — JOINT COMMISSION ON SCIENCE TEACHING.

ITEM 20. — JOINT COMMISSION ON APPLIED RADIOACTIVITY.

ITEM 22. — UNIONS AND ASSOCIATIONS WANTING AFFILIATION WITHIN I.C.S.U.

Resolution EB (XIV) 30.

The Executive Board,

considered the report of the Working Group established during the 14th Executive Board Meeting to study the problem of Unions and Associations wanting affiliation within I.C.S.U. and the possibility of grouping the Unions into large subject areas,

decided to convey the views expressed in the report to the Committee on the Future of I.C.S.U.

ITEM 23. — VOTES BY CORRESPONDENCE.

Resolution EB (XIV) 31.

The Executive Board,

resolved that :

1) votes by correspondence should only be used when absolutely necessary ;
2) such votes should only be valid if the procedure is approved by 2/3 of the members of the Executive Board (at present 20) ;
3) the motion would be carried with a simple majority of the members of the Executive Board (at present 16) ;
4) in cases when one of the Unions has not designated its representative on Board, the voting circulars should be sent to the General Secretary.

ITEM 25. — YEAR BOOK.

Resolution EB (XIV) 32.

The Executive Board,

decided that no biographic notices should be included in the Year Book of I.C.S.U. for the moment.

ITEM 26. — I.C.S.U. REVIEW.

ITEM 30. — RELATIONS WITH U.N.E.S.C.O.

Resolution EB (XIV) 34.

The Executive Board,

recommended that the General Secretary send a letter to all National Members emphasizing the necessity of ensuring that the national delegations to the General Conference of U.N.E.S.C.O. as well as to Scientific Commissions include scientists who are well informed of the role and activities of I.C.S.U., and of the various International Scientific Unions which are member of I.C.S.U., so that when questions concerning financial subventions for scientific research come up before the General Conference of U.N.E.S.C.O., the interests of science, at the national and international level, are properly represented.

ITEM 31. — RELATIONS WITH OTHER INTERNATIONAL ORGANIZATIONS.

ITEM 33. — COMMITTEE ON ATMOSPHERIC SCIENCES AND HYDROLOGY.

Resolution EB (XIV) 36.

The Executive Board,

noting with considerable interest the following recommendation which was forwarded by the President of the National Academy of Sciences of the United States with the formal endorsement of the Governing body of the National Academy of Sciences, National Research Council :

« That the International Council of Scientific Unions be requested to establish a special Committee on Atmospheric Sciences and Hydrology with the functions of :

1) studying and fostering programmes of international co-operative research, and
2) providing advice if requested to intergovernmental bodies having responsibilities for international action in these fields. »

refers it to the Executive committee of the I.U.G.G. for detailed study in consultation with other Unions and for further recommendation to I.C.S.U. ;

invites attention to its prior decision on the UN Resolution 1721 (XVI), and the International Hydrological Programme.

I. A. U.

International Polar Motion Service

Memorandum by the General Secretary of the International Astronomical Union

In view of the delay in obtaining formal concurrence to the recommendations made by the International Astronomical Union, and the urgent necessity for practical decisions, I, as General Secretary of the I.A.U., have decided to put into immediate operation the following arrangements for the Central Bureau (referred to sometimes as the Computing Centre) and the scientific direction of the International Polar Motion Service.

1. THE CENTRAL BUREAU. — As proposed by the Science Council of Japan, and as recommended by the Executive Committee of the I.A.U., the Central Bureau (or Computing Centre) of the I.P.M.S. will continue to be located at Mizusawa, Japan. Dr. S. Yumi will be invited to assume the position of Acting Director of the Bureau, and to take over from Dr. T. Ikeda at the earliest convenient opportunity.

2. THE COUNCIL. — A *provisional* Council, which is to direct the Service in scientific matters, will be constituted as follows :

President : B. GUINOT (President of I.A.U. Commission 19).

Representatives of the I.A.U. : E. P. FEDOROV and B. GUINOT.

Representatives of the I.U.G.G. (I.A.G.) : W. MARKOWITZ and P. J. MELCHIOR.

The Acting Director : S. YUMI.

There is at present no representative of the Federation of Astronomical and Geophysical Services (F.A.G.S.).

3. — Subject to the concurrence of the Science Council of Japan, the President of the provisional Council, Dr. B. Guinot, will be invited to visit Mizusawa at an early date to discuss the

scientific direction of the Service with the Acting Director, Dr. S. Yumi.

4. — These arrangements will be reviewed at the twelfth General Assembly of the I.A.U. to be held in Hamburg, Germany, in August 1964.

5. — The above arrangements will be formally communicated to the Science Council of Japan and to the Académie des Sciences in Paris.

6. — Copies of this memorandum are being circulated to all concerned with the International Polar Motion Service as follows : Science Council of Japan ; Académie des Sciences, Paris ; Executive Committee of the I.A.U. ;

Presidents and Secretaries of I.U.G.G., I.A.G. and F.A.G.S. ; General Secretary and Executive Secretary of the I.C.S.U. ;

Members of the provisional Council of the Service ;

G. Cecchini, W. Fricke, T. Ikeda, A. A. Mikhailov, S. Miyadi, C. A. Murray.

22 November 1962.

D. H. Sadler,
General Secretary, I.A.U.

Constitution of the International Polar Motion Service

Aims of the Service

The International Polar Motion Service is a « Permanent Service », within the Federation of Astronomical and Geophysical Services (F.A.G.S.), entrusted with the following tasks :

(*a*) to promote the study of all problems relating to the polar motion ;

(*b*) to collect astronomical observations from which this motion can be derived ;

(*c*) to analyse and synthesize them ;

(*d*) to compute the co-ordinates of the pole ;

(*e*) to distribute data on request ;

(*f*) to publish initial data and results obtained.

Composition of the Service

(1) The Service comprises a number of astronomical observatories which are willing to co-operate in the study of the polar motion by supplying observational data to the Computing Centre (section (3) below).

(2) The direction of the Service in scientific matters is exercised by a Council consisting of : the President, nominated by the F.A.G.S. ; two representatives of the International Astronomical Union ; two representatives of the International Union of Geodesy and Geophysics ; and the Director of the Computing Centre. The Council shall lay down the principles on which the derivation of the polar motion should be based, and shall advise the Director of the Computing Centre on the practical implication of these principles in computing the coordinates of the pole.

(3) The Director of the Computing Centre shall :

(*a*) develop methods for combining the observational data in order to obtain the polar motion, and submit them to the Council of the Service ;

(*b*) collect observational data and compute the co-ordinates of the pole ;

(*c*) supply the results to those desiring them ;

(*d*) every two years, submit to the Council of the Service a report on the work done by the Computing Centre and consult the Council as to what modifications should be made in the methods and organization of the work ;

(*e*) publish the co-ordinates of the pole, together with the initial observational data from which they are computed, and with a description of the methods used.

Drafted by E. P. FEDOROV, President of I.A.U. Commission, 19 July, 1961.

Adopted by I. L. S. Working Party in Berkeley, 17 August 1961

Approved by Executive Committee, I.A.U., 22 August, 1961 ; I.A.U. appointed as its representatives : E. P. FEDOROV and B. GUINOT.

Approved by I.U.G.G.
Representatives.
Approved by F.A.G.S.
Representative, as President of the Council.

O. M. M.

4e Congrès Météorologique Mondial

Le Prof. Dr J. Lugeon, Président du Comité National Suisse de l'U.R.S.I. et Directeur de l'Institut Météorologique Suisse, a bien voulu accepter de représenter l'U.R.S.I. au 4e Congrès Météorologique Mondial qui se tiendra à Genève du 1er au 27 avril 1963.

W. M. O.

4th World Meteorological Congress

Prof. Dr. J. Lugeon, Honorary President of the Swiss N. C. of U.R.S.I. and Director of the Swiss Meteorological Institute has kindly agreed to represent U.R.S.I. at the 4th World Meteorological Congress which will be held in Geneva, April 1-27, 1963.

UNESCO

Etudes à l'Etranger XIV - 1963

Le tome XIV d'*Etudes à l'étranger* contient des renseignements sur près de 130.000 bourses d'étude, de recherche et de voyage à l'étranger offertes pour 1963 et 1964. Ces offres proviennent d'environ 1.690 organisations et institutions situées dans 116 Etats et territoires. Trois des pays donateurs figurent pour la première fois dans le répertoire ; ce sont le Congo (Léopoldville), Koweit et le Niger.

Les bourses énumérées concernent pratiquement tous les domaines d'étude ou de recherche et presque tous les pays du monde. Leur durée varie de plusieurs semaines à six ou sept ans.

Le tome XIV comprend comme les précédents un chapitre dans lequel sont énumérées environ 300 organisations et institutions où fonctionnent des services de renseignements et d'assistance à l'intention des personnes désireuses d'aller étudier à l'étranger.

Il contient aussi le rapport sur l'enquête annuelle de l'U.N.E.S.C.O. relative aux étudiants étrangers inscrits dans les établissements d'enseignement supérieur. Dans ce chapitre, comme dans celui où sont analysées les offres de bourses mentionnées au tome précédent d'*Etudes à l'étranger* (XIII), les informations de nature à intéresser les personnes qui s'occupent de statistiques internationales de l'enseignement sont présentées sous une nouvelle forme.

Catégorie A.

Nombre approximatif de pages : 740.

Prix approximatif : 10.50 NF, $ 3.00, 15/-.

Date probable de publication : novembre 1962.

Trilingue : français/anglais/espagnol.

Study Abroad XIV - 1963

The fourteenth edition of « Study Abroad » contains information on nearly 130,000 individual opportunities for subsidized international study and travel in 1963 and 1964. These scholarships and fellowships are offered by approximately 1,690 organizations and institutions in 116 states and territories, including three donor countries listed in the handbook for the first time : Congo (Léopoldville), Kuwait and Niger.

The fellowships and scholarships listed are available for work in virtually all fields of learning and research, and can be held in almost all parts of the world. The duration of studies varies from several weeks to six or seven years.

As in previous years, the forthcoming edition contains a chapter listing about 300 organizations and institutions offering advisory services and practical help to persons wishing to study abroad.

Also included in this edition is the report on U.N.E.S.C.O.'s annual survey of foreign students enrolled in institutions of higher education. In this chapter, as well as in the chapter which analyses the awards made in the previous edition (Vol. XIII) of « Study Abroad », changes have been made in the presentation of information which should be of interest to persons concerned with the statistics of international education.

Category A.

Approx. no. of pages : 740.
Approx. price : $ 3.00, 15/-, 10.50 NF.
Approx. date of publication : November 1962.
Trilingual English/French/Spanish.

BIBLIOGRAPHIE

Commission Electrotechnique Internationale

Publication 96-1. *Deuxième édition.* — Câbles pour fréquences radioélectriques. Première partie : Prescriptions générales et méthodes de mesure. Cette publication se rapporte aux câbles coaxiaux flexibles ou semi-flexibles, ainsi qu'aux conducteurs du type jumelé (ou en paires) pour fréquences radioélectriques destinés à être utilisés dans les équipements de radiocommunication et dans les dispositifs électroniques basés sur des techniques analogues. Le diélectrique de ces câbles peut être du type massif, aéré ou semi-aéré, et réalisé avec un diélectrique constitué par une résine thermoplastique polymérisée, à faibles pertes, un mélange thermodurcissable ou une matière minérale.

L'objet de la première partie est d'établir des conditions uniformes d'appréciation des propriétés électriques, climatiques et mécaniques des câbles utilisés aux fréquences radioélectriques et de décrire des méthodes d'essais. Elle comprend les sections suivantes : Généralités ; Essais électriques ; Essais climatiques et de robustesse mécanique ; Marquage.

La principale modification par rapport à la première édition est l'addition d'une annexe de 30 pages donnant des informations sur les méthodes de mesures additionnelles.

La composition et les caractéristiques détaillées de chaque type de câble sont prescrites dans la deuxième partie de la Publication 96, éditée comme Publication 96-2.

Cette publication est en vente au Bureau Central de la C. E. I., au prix de Fr. S. 20.— l'exemplaire, plus frais de port.

Publication 82. *Deuxième édition.* — Ballasts pour lampes à fluorescence. Prix : Fr. S. 24.— l'exemplaire plus frais de port.

Publication 86-1. *Deuxième édition.* — Piles électriques. Première partie : Généralités. Cette publication s'applique aux piles sèches, avec pour objet l'énumération des modèles répondant aux besoins les plus courants, la définition de leurs caractéristiques afin d'en assurer l'interchangeabilité, et la limitation de leur nombre.

Pour la deuxième édition de la publication, il a été décidé de sub-diviser la recommandation complète en trois parties, en vue de faciliter les références et les révisions.

La première partie de la deuxième édition (Publication 861) vient de paraître ; elle contient les articles suivants : classification générale des

types de piles, définitions de base, mode de désignation des éléments et des piles, organes de connexion, marquage, conditions générales de fabrication, conditions d'essais, essais de conservation.

La deuxième partie : Feuilles de spécifications (Publication 86-2 de la C. E. I.) est en cours d'impression et paraîtra sous peu.

La troisième partie : Organes de connexion (Publication 86-3 de la C. E. I.) est en préparation.

Prix : Fr. S. 4,50 plus frais de port.

Publication 106*A*. *Première édition.* — Complément à la Publication 106 (1959). Méthodes recommandées pour les mesures de rayonnement sur les récepteurs radiophoniques pour émissions de radiodiffusion à modulation d'amplitude et à modulation de fréquence et sur les récepteurs de télévision.

La publication 106A de la C. E. I., qui vient de paraître, constitue un complément à la Publication 106, avec laquelle elle doit être utilisée ; elle spécifie la méthode de mesure de rayonnement, à la fréquence intermédiaire et à ses harmoniques, dans la gamme de 30 MHz à 300 MHz, des récepteurs à modulation de fréquences fonctionnant dans la gamme de 88 MHz à 108 MHz. Elle concerne, en outre, une extension de la méthode générale de mesure de rayonnement de ces récepteurs à la gamme de 300 MHz à 1000 MHz.

Prix : Fr. S. 6.— l'exemplaire, plus frais de port.

Union Internationale des Télécommunications

L'U.I.T. vient de publier la *Nomenclature des voies de communication radiotélégraphiques entre points fixes*, 1962.

La dernière édition de cette Nomenclature date de 1960. Depuis cette date, de nombreux territoires ont acquis leur indépendance et sont devenus Membres de l'Union. De ce fait, les nombreuses modifications devant être apportées à l'ancienne édition nécessiteraient la publication d'un supplément fort volumineux. Pour des raisons d'ordre pratique, le Secrétariat général de l'Union a estimé qu'il était préférable de publier une nouvelle édition mise à jour.

Cette nouvelle Nomenclature a fait l'objet d'une édition trilingue (française, anglaise et espagnole). Le prix de vente a été fixé à 10.— Fr. S. l'exemplaire ; ce prix comprend les frais de port pour envoi par la poste ordinaire dans le monde entier, l'emballage et l'abonnement aux suppléments qui paraîtront jusqu'à la prochaine édition.

La liste complète des publications de l'U.I.T. avec indication de leur prix de vente, sera envoyée gratuitement sur demande adressée à la Section des Ventes de l'Union internationale des télécommunications, Place des Nations, Genève, Suisse.

BIBLIOGRAPHY

International Electrotechnical Commission

Publication 96-1. *Second edition.* — Radio-frequency cables. Part 1 : General requirements and measuring methods. This publication applies to flexible or semi-flexible radio-frequency cables of coaxial or twin conductor types with dielectric of solid, air-spaced, or semi-airspaced types of thermoplastic low-loss polymeric resin or thermo-setting compound, or mineral material, designed for use in radio-communication equipment and in electronic devices employing similar techniques.

The object of Part 1 is to lay down uniform requirements for judging the electrical climatic and mechanical properties of radio-frequency cables and to describe test methods. It contains the following sections : General ; Electrical tests ; Climatic and mechanical robustness tests, Marking.

The main change with respect to the first edition is the inclusion of a 30-page Appendix describing additional methods of measurement.

The detailed construction and characteristics for each type of cable are laid down in Part 2 of Publication 96, issued under the reference Publication 96-2.

This publication is on sale at the Central Office of the I.E.C., at the price of Sw. Fr. 20.—, per copy, plus postage.

Publication 82. *Second edition.* — Ballasts for fluorescent lamps. Price : Sw. Fr. 24, plus postage.

Publication 86-1. *Second edition.* — Primary cells and batteries. Part 1 : General.

Publication 86 applies to dry primary cells and batteries with the object of enumerating the types corresponding to the most current needs, defining their characteristics, ensuring their interchangeability and limiting their number.

For the second edition of the publication, it has been decided to divide the complete recommendation into three parts, in order to facilitate reference and revision.

The first part of the second edition has just been issued as I.E.C. Publication 86-1, which contains the following sections : general classification of types of batteries, basic definitions, method of designation of cells and batteries, terminals, marking, general conditions of manufacture, conditions of tests, delayed tests.

The second part, Specification sheets (I.E.C. Publication 86-2) is now in course of printing and will be issued shortly.

Part 3 : Terminals (I.E.C. Publication 86-3) is in preparation.

Price : Sw. Fr. 4,50 per copy plus postage.

Publication 106*A*. *First edition.* — Supplement to Publication 106 (1959) : Recommended methods of measurement of radiation from receivers for amplitude modulation and television broadcast transmissions.

This Publication supplements Publication 106, in conjunction with which it should be used. It lays down the procedure for measuring the radiation at the intermediate frequency and its harmonics, in the range 30 MHz (Mc/s) to 300 MHz (Mc/s), from frequency-modulation receivers operating in the range 88 MHz (Mc/s) to 108 MHz (Mc/s). It also deals with the extension of the general method of measurement of radiation from these receivers to the range 300 MHz (Mc/s) to 1000 MHz (Mc/s).

Price : Sw. Fr. 6.— per copy plus postage.

International Telecommunication Union

The I.T.U. has just issued the *List of Point-to-Point Radiotelegraph Channels*, 1962.

The last edition of this List was published in 1960. Since then, many territories have become independent and are now Members of the Union. The many amendments thus necessitated in the old edition would require a very bulky supplement, so for practical reasons the General Secretariat of the Union felt that it would be preferable to publish a new, up-to-date edition.

The new List appears in a trilingual edition (English, French and Spanish) at 10.— Sw. Fr. per copy ; this price includes carriage by ordinary post to all parts of the world, as well as the supply of all supplements issued before the next edition.

A complete list of I.T.U. publications, with prices, may be had free of charge from the Sales Department of the International Telecommunication Union, Place des Nations, Geneva, Switzerland.