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U. R. S. I.

TABLE DES MATIÈRES — CONTENTS

BUREAU

Procès-verbal de la réunion de Bruxelles

Le Bureau de l'U.R.S.I. a tenu à Bruxelles, du 26 au 28 février, une réunion à laquelle assistaient :
Prof. I. KOGA, Président.
Dr. R. L. SMITH-ROSE, Président sortant.
M. B. DECAUX, Vice-Président.
Prof. Ch. MANNEBACK, Trésorier.
Ing. E. HERBAYS, Secrétaire Général.

Les décisions ci-après ont été prises au cours de cette réunion :

1. — RÉORGANISATION DE L'U.R.S.I.

Un Comité pour la Réorganisation de l'U.R.S.I. a été constitué comme suit :

Convener : Dr. R. L. SMITH-ROSE (qui assurera la liaison avec l'I.C.S.U.).

Membres : Prof. W. J. G. BEYNON,
M. B. DECAUX,
M. J. A. RATCLIFFE,
Prof. S. SILVER,
Prof. E. VASSY.

Membres Consultatifs : Dr. L. V. BERKNER,
Prof. H. G. BOOKER,
Prof. W. N. CHRISTIANSEN,
Dr. L. Essen,
M. J. Voge,
Prof. G. A. WOONTON.

Le Comité a le pouvoir de coopter d'autres membres consultatifs.

Un mémorandum exposant les vues du Bureau a été envoyé à tous les membres du Comité. Celui-ci a été invité à soumettre au Bureau, avant la fin de l'année, un rapport exposant ses travaux

et propositions. Ce rapport sera examiné par le Bureau qui le communiquera avec ses commentaires à tous les Comités Nationaux.

2. — Commission Inter-Unions des Sciences de l'Atmosphère

Le Prof. W. J. G. Beynon et M. J. A. Ratcliffe ont été invités à représenter l'U.R.S.I. au sein de cette Commission.

3. — Symposium sur la Physique des Phénomènes solaires-terrestres

Les personnalités ci-après ont été invitées à faire partie du Comité Organisateur du Symposium Général sur la Physique des Phénomènes solaires-terrestres qui se tiendra en Yougoslavie en 1966 avant l'Assemblée Générale.

Convener : Le représentant du Comité National Yougoslave.

Membres : M. J. A. Ratcliffe,
Prof. H. C. Booker,
Prof. R. Coutrez,
Prof. A. Kimpara,
Prof. W. N. Dieminger.

L'attention de ce Comité a été attirée sur les points suivants qui, parmi d'autres, pourraient figurer au programme, sous réserve d'accord par les Commissions intéressées :

— Influences du soleil sur la haute atmosphère (Commission III).
— Méthodes radioastronomiques, Radioastronomie planétaire, Radio Galaxies, Radio-émission galactique (Commission V).

Le Comité est invité à coopter des membres pour assurer la liaison avec les autres organismes internationaux qui pourraient être intéressés.

4. — Sous-Commission Permanente du Bruit Radioélectrique d'Origine Terrestre

Le projet de Mandat de cette Sous-Commission, présenté par le Prof. A. Kimpara, Président de la Sous-Commission, a été accepté. Ce Mandat est publié p. 50.

5. — Réunions scientifiques

Le Bureau a marqué son accord sur l'organisation par l'U.R.S.I. des réunions ci-après ou sur sa participation à certaines réunions

organisées par d'autres organisations, et particulièrement, par le C.O.S.P.A.R. :

En collaboration avec le C.O.S.P.A.R. :

en 1964 — Interaction des particules énergétiques avec l'atmosphère (Commission III) ;
— Emission radioélectrique par des courants de particules énergétiques (Commission IV) ;

en 1965 — Structure et chimie de l'atmosphère (Commission III).

Sujets proposés par les Commissions et Comités :

II — Etudes radioélectriques des surfaces et atmosphères planétaires, en 1965 (sujet pouvant intéresser la Commission V et le Comité des Recherches Radioélectriques dans l'Espace) ;

VI — Théorie Electromagnétique, en 1965 ;

Comité U.R.S.I.-C.I.G. — Réunion spéciale pour l'I.Q.S.Y., conjointement avec la réunion du C.O.S.P.A.R., mai 1964 ;
— Réunion administrative en 1965, conjointement avec la réunion du Comité de l'I.Q.S.Y.-C.I.G.

Le Secrétaire Général a été invité à demander des renseignements complémentaires au sujet des réunions proposées par les Commissions II, VI et VII.

6. — XV^e^ Assemblée Générale

Au cours de la réunion, le Bureau a étudié les dispositions à prendre en vue de la XV^e^ Assemblée Générale et, dans ce but, il a procédé à la révision des « Directives pour la préparation et l'organisation des Assemblées Générales » (voir p. 9) et des « Recommandations aux Présidents des Commissions pour la préparation et l'organisation des Assemblées Générales » (voir p. 19)

BOARD OF OFFICERS

Minutes of the Brussels Meeting

The Board of U.R.S.I. held a meeting in Brussels on February 26-28th, 1964.

The following Officers attended the meeting :

Prof. I. KOGA, President.
Dr. R. L. SMITH-ROSE, Past President.
Mr. B. DECAUX, Vice-President.
Prof. Ch. MANNEBACK, Treasurer.
Eng. E. HERBAYS, Secretary General.

The following actions were reached :

1. — REORGANISATION OF U.R.S.I.

A Committee on the Future Organization of U.R.S.I. was set up with the following membership :

Conveners : Dr. R. L. SMITH-ROSE (who will act also as liaison with I.C.S.U.).

Member : Prof. W. J. G. BEYNON,
Mr. B. DECAUX,
Mr. J. A. RATCLIFFE,
Prof. S. Silver,
Prof. E. Vassy.

Consultants : Dr. L. V. BERKNER,
Prof. H. G. BOOKER,
Prof. W. N. CHRISTIANSEN,
Dr. L. ESSEN,
Mr. J. VOGE,
Prof. G. A. WOONTON.

This Committee has the power to co-opt consultants.

A memorandum stating the views of the Board was sent to the members and consultants of the Committee. The Committee has been asked to report before the end of 1964 on its activities

and proposals. This report will be considered by the Board and circulated to all National Committees together with the Board's comments.

2. — Inter-Union Commission on Atmospheric Sciences

Prof. W. J. G. Beynon and Mr. J. A. Ratcliffe were asked to serve as U.R.S.I. representatives on this Commission.

3. — Symposium on Solar-Terrestrial Physics

The following personalities were asked to serve on the Organising Committee for the General Symposium on Solar-Terrestrial Physics which will be held in Yugoslavia in 1966 previously to the General Assembly.

Convener : The representative of the Yugoslav National Committee.

Members : Mr. J. A. Ratcliffe,
Prof. H. C. Booker,
Prof. R. Coutrez,
Prof. A. Kimpara,
Prof. W. N. Dieminger.

The attention of this Committee was drawn to the following tentative topics which, among others, might be included in the programme, if the interested Commissions agree :

— Solar influences on the upper atmosphere (Commission III).

— Radio Astronomy Techniques, Planetary Radio Astronomy, Radio Galaxies, Galactic Radio Astronomy (Commission V).

The Committee is invited to co-opt members to ensure the liaison with other international bodies which might be interested.

4. — Permanent Sub-Commission on Radio Noise of Terrestrial Origin

The draft Terms of Reference of this Sub-Commission proposed by Prof. A. Kimpara, Chairman of the Sub-Commission were endorsed (The Terms of Reference are given p. 50).

5. — Scientific Meetings

The Board agreed on the organization by U.R.S.I. of the following meetings or on the participation to some meetings organized by other bodies and particularly by C.O.S.P.A.R.

In collaboration with C.O.S.P.A.R :

in 1964 — Interaction of energetic particles with the atmosphere (Commission III) ;

— Generation of radio noise by energetic particle streams (Commission IV).

in 1965 — Structure and chemistry of atmosphere (Commission III).

Topics suggested by Commissions and Committees :

II — Radio studies of planetary surface and atmospheres, in 1965 (interested : Commission V and Space Radio Research Committee) ;

VI — Electromagnetic theory, in 1965 ;

VII — Quantum Electronics, in 1964.

U.R.S.I./C.I.G. — Special meeting on I.Q.S.Y., conjointly with C.O.S.P.A.R. 1964 symposium ;

— Business meeting in 1965, in association with C.I.G./I.Q.S.Y. Assembly.

The Secretary General was instructed to ask for further information on the meetings suggested by Commissions II, VI and VII.

6. — XVth General Assembly

During the meeting the Board investigated the steps to be taken in view of the XVth General Assembly and to this end revised the « Guide for preparation and organization of General Assemblies » (see page 26) and the « Recommendations to Commission Chairmen for preparation and organization of General Assemblies » (see p. 36).

ASSEMBLÉES GÉNÉRALES

Les Directives pour la préparation et l'organisation des Assemblées Générales, et les Recommandations aux Présidents des Commissions et des Comités, publiées dans le nº 125 du *Bulletin d'Information de l'U.R.S.I* (mars-avril, 1961) ont été revisées à la lumière des expériences acquises au cours de la XIVe Assemblée Générale par ceux qui prirent une part active à sa préparation et à son organisation.

Directives pour la préparation et l'organisation des Assemblées Générales

REMARQUE PRÉLIMINAIRE : Ces directives doivent être considérées comme tendant à faciliter la préparation et l'organisation des Assemblées Générales ; elles pourront être adaptées aux circonstances locales.

1. — COMITÉ ORGANISATEUR

1.1. — Le Comité National du pays où doit se tenir l'Assemblée Générale désigne un Comité Organisateur chargé d'examiner, sur le plan pratique et en liaison étroite avec le Secrétaire Général, tous les aspects du déroulement de cette Assemblée.

1.2. — Il est conseillé que ce Comité comporte un membre responsable pour chacune des activités particulières nécessitées par la préparation et l'organisation de l'Assemblée : par exemple, relations extérieures, finances, programme scientifique, logement et inscription des délégués, conduite des réunions, etc.

1.3. — Il est conseillé également au Comité Organisateur de constituer un Bureau Exécutif pour assurer, au cours de la phase préparatoire, une liaison rapide et étroite avec le Secrétaire Général de l'Union.

2. — Comité de Coordination

2.1. — Un représentant du Comité Organisateur assistera aux réunions du Comité de Coordination (Bureau de l'U.R.S.I. et Présidents des Commissions) lorsque ces réunions s'occuperont de la préparation et de l'organisation d'une Assemblée Générale.

2.2. — Le Comité de Coordination a pour mission de déterminer les sujets qui seront discutés par les diverses Commissions au cours de l'Assemblée Générale et d'établir le programme scientifique définitif de celle-ci.

2.3. — Le Comité de Coordination entrera en fonction au plus tard au début de l'année précédant celle de l'Assemblée Générale. Il peut être consulté par correspondance par les soins du Secrétaire Général.

3. — Finances

3.1. — La nation invitante supporte les frais d'organisation de l'Assemblée Générale et l'Union ceux de reproduction et de distribution des documents scientifiques antérieurement à l'Assemblée.

3.2. — L'Union peut également rembourser, totalement ou partiellement, les frais de voyage de certains participants désignés par le Bureau.

3.3. — Le Comité National de la nation invitante est invité à communiquer au Secrétaire Général le nom des participants auxquels il déciderait d'accorder une aide pécuniaire.

4. — Dates

4.1. — Les dates approximatives de l'Assemblée Générale sont fixées par l'Assemblée précédente ; les dates exactes sont déterminées de commun accord par le Comité Organisateur et le Secrétaire Général.

4.2. — En principe, l'Assemblée Générale a une durée minimum de dix jours ouvrables. Elle est précédée d'une période de trois jours réservée à des réunions administratives du Bureau, du Comité Exécutif, du Comité de Coordination et des membres officiels des Commissions.

5. — Participants aux Assemblées Générales

5.1. — Les participants aux Assemblées Générales comprennent :

a) *Les participants officiels* :

(i) les Présidents d'Honneur, les Membres du Bureau, les anciens Présidents ;

(ii) les Présidents, Vice-Présidents et Secrétaires des Commissions et les Présidents des Sous-Commissions et Groupes de Travail officiellement reconnus ;

(iii) les délégués officiels et ordinaires désignés par les Comités Nationaux (Statuts, art. 4).

b) *Les observateurs* invités par le Président de l'U.R.S.I. ou par le Comité National du pays invitant qui les choisit parmi des personnes appartenant à ce pays. La participation aux manifestations autres que les séances scientifiques des personnes appartenant à la dernière catégorie est laissée à la latitude du Comité Organisateur.

5.2. — Le Comité Organisateur prépare les formulaires à remplir par les personnes assistant à l'Assemblée Générale. Ils porteront mention d'une date limite, avant laquelle ils devront être renvoyés au Comité Organisateur ou au Secrétaire Général de l'U.R.S.I.

a) Ces formulaires pourront être imprimés en *deux couleurs*, l'une pour les participants de la catégorie *a*), l'autre pour ceux de la catégorie *b*).

b) Ils mentionneront le *nom*, l'*adresse* et le *titre* du participant, ainsi que le nom et la qualité des personnes de sa famille qui l'accompagnent.

c) Ces formulaires contiendront la *liste* des Commissions de l'U.R.S.I., ainsi qu'éventuellement la liste des réunions scientifiques à tenir au cours de l'Assemblée Générale. Les participants seront invités à indiquer, à côté de la mention relative aux Commissions et réunions scientifiques, s'il désirent recevoir les documents s'y rapportant ; les documents leur seront distribués en tenant compte de ces indications.

5.3. — Le Secrétaire Général fournit au Comité Organisateur la liste des noms, adresses et titres à l'U.R.S.I. des personnes appartenant aux catégories mentionnées en (*a*) ci-dessus. Les invitations et formulaires sont envoyés directement par le Comité

Organisateur à toutes ces personnes ; au moment de l'envoi, les formulaires porteront la mention du nom et du titre à l'U.R.S.I. du destinataire. Le Comité Organisateur informe de ces envois les Comités Nationaux auxquels appartiennent les destinataires.

5.4. — Les Comités Nationaux font connaître au Comité Organisateur et au Secrétaire Général de l'U.R.S.I., au moins 8 mois avant l'Assemblée Générale, les noms des personnalités qu'ils ont désignées : *a*) comme délégué au Comité Exécutif conformément à l'article 15 des Statuts (catégorie iii) ; *b*) comme délégués officiels conformément à l'article 26 des Statuts (catégorie iii). Les Comités Nationaux ont toute latitude pour désigner des personnalités de leur pays comme délégués (*a* et *b*).

Les invitations et formulaires sont envoyés par le Comité Organisateur aux personnalités désignées, dès qu'il sera informé de leur désignation.

5.5. — Le Comité Organisateur envoie des formulaires d'inscription aux observateurs (participants de la catégorie *b*) après avoir été informé soit par le Président, soit par le Comité National du pays invitant que ces personnes ont été invitées, et il fournit au Secrétaire Général une réserve de formulaires destinés aux personnes de la catégorie (*b*) invitées par le Président de l'U.R.S.I.

Des copies des lettres d'invitation sont envoyées au Comité Organisateur pour information.

5.6. — Les Comités Nationaux désirant voir inviter comme observateurs des personnalités de leur pays n'appartenant pas à la catégorie (*a*) de l'article 5.1 devront les proposer au Président de l'U.R.S.I., par l'intermédiaire du Secrétaire Général. Il sera fait exception à cette règle pour le Comité National du pays invitant. Les Présidents des Commissions pourront procéder de la même façon.

5.7. — Les demandes de participation reçues par le Comité Organisateur et ne remplissant pas les conditions ci-dessus, sont renvoyées aux expéditeurs.

5.8. — Le cas de toute personne se présentant à l'Assemblée Générale sans avoir envoyé une demande de participation sera soumis au chef de la délégation de son pays qui décidera si elle peut être admise ou non et, en cas d'acceptation, si elle sera considérée comme délégué ou comme observateur. Le cas de personnes appartenant à un pays ne faisant pas partie de l'U.R.S.I. sera soumis au Secrétaire Général qui en référera au Président de l'U.R.S.I.

5.9. — Le Comité Organisateur envoie périodiquement au Secrétaire Général la liste des personnes qui se sont inscrites. Réciproquement, le Secrétaire Général tient le Comité Organisateur au courant de toutes les demandes d'inscription qu'il a reçues ainsi que des invitations envoyées au nom du Président de l'U.R.S.I.

6. — Logement et réception des participants

6.1. — Le Comité Organisateur est invité à aider les participants venant de l'étranger à obtenir le logement pendant leur séjour et à leur fournir tous renseignements nécessaires pour leur séjour.

6.2. — Si les circonstances l'indiquent, le Comité Organisateur prendra les dispositions nécessaires pour accueillir les participants étrangers lors de leur arrivée au siège de l'Assemblée Générale.

7. — Locaux et arrangements pour l'Assemblée Générale

7.1. — Les locaux pour l'Assemblée Générale devraient comprendre, dans la mesure du possible :

— un hall de réception,
— un vestiaire,
— un salon de conversation,
— une salle de lecture,
— un bureau pour le Président de l'U.R.S.I.,
— un bureau pour le Secrétaire Général et son équipe,
— un bureau pour le Comité Organisateur,
— un bureau pour les dactylos,
— une salle de réunion pour le Comité Exécutif et les réunions administratives (30 personnes environ),
— une salle de lecture pour les Présidents de Commissions et de Comités,
— un nombre suffisant de salles de réunions pour les Commissions et des locaux pour les groupes de travail,
— une salle pour les réunions plénières.

7.2. — Il est désirable que le Comité Organisateur prenne des dispositions pour que des rafraichissements (thé ou café, etc.) puissent être servis dans le courant de la journée. Si les restaurants

font défaut dans le voisinage des locaux où se tiennent les réunions, il convient que des dispositions soient prises pour que des collations puissent être servies au milieu de la journée.

7.3. — Le hall de réception devrait comporter :

a) *Un bureau d'accueil et d'inscription* pour les participants, avec du personnel de réception.

b) *Un bureau de renseignements.* Celui-ci doit pouvoir fournir une aide pour les déplacements, les banques, les services postaux, les communications téléphoniques et télégraphiques, les voyages de retour des participants. Au moins quelques-uns des membres du personnel de réception devraient connaître plusieurs langues, et certainement les deux langues officielles de l'U.R.S.I. (français et anglais).

c) *Un bureau d'inscription* aux manifestations et aux excursions.

d) *Un bureau de distribution* du courrier des participants et des documents, équipé de casiers nominaux. Afin d'éviter les erreurs, il est déconseillé de permettre aux participants de retirer eux-mêmes leur courrier et leurs documents ; les casiers doivent être sous la surveillance directe du personnel de réception qui remettra les documents sur production de la carte d'inscription.

e) *Des tableaux* permettant d'inscrire et d'afficher des avis. Il est déconseillé de permettre aux participants d'afficher eux-mêmes des avis. Ces tableaux devraient être placés sous la surveillance directe du personnel de réception. Toute communication d'avis se rapportant aux travaux de l'Assemblée sera faite par le Secrétaire Général.

7.4. — Il convient que toutes les salles de réunion destinées aux Commissions soient munies au moins de deux tableaux noirs, et qu'un certain nombre permette des projections lumineuses. Les appareils de projection devraient comprendre des *épidiascopes* permettant la projection de *dessins.* Bien que les dimensions normales soient 8,5 × 8,5 cm (3,25″ × 3,25″), 8,5 × 10 cm (3,25″ × 4″) et 5 × 5 cm (2″ × 2″), on peut s'attendre à ce que soient demandées la projection de dessins de 15 × 15 cm (6″ × 6″) et de strips films de 24 × 36 mm et 18 × 24 mm.

Il conviendrait aussi que le Comité Organisateur prévoie l'utili-

sation de projecteurs cinématographiques de 16 mm et 8 mm (respectivement films de 300 m et de 75 m).

Tous les appareils ne seront pas nécessaires en même temps pour toutes les salles. Il convient de prévoir cependant que toutes les séances de Commision pourraient être accompagnées de projections lumineuses. Il convient également de disposer de *magnétophones* (pour bandes magnétiques) pour les réunions scientifiques et, éventuellement, d'*amplificateurs* et de *hauts parleurs* pour les grandes salles.

7.5. — Le Comité Organisateur doit prévoir la reproduction de documents pendant l'Assemblée (Rapports des Commissions, Sous-Commissions et Groupes de Travail, etc.). Un appareil de reproduction photographique de documents devrait être mis, si possible, à la disposition de l'équipe dactylographique du Secrétaire Général.

7.6. — Il serait utile que le drapeau de l'U.R.S.I. puisse être hissé à l'entrée du siège principal de l'Assemblée Générale.

8. — Programme type

Le programme ci-dessous est donné à titre d'exemple ; il pourra être modifié suivant les désirs et possibilités du Comité Organisateur.

8.1. — *Période précédant l'Assemblée Générale* :

1er jour : Réunion du Bureau,

2e jour : Réunion du Comité Exécutif,

3e jour : Réunion du Comité Exécutif, Réunion du Comité de Coordination.

Pendant ces trois premiers jours, inscription des participants.

8.2. — *Assemblée Générale* :

1er jour :

Matin : Inscription des participants.

Après-midi : Séance plénière inaugurale (celle-ci est suivie de la cérémonie du drapeau et, éventuellement d'une prise de photographies et d'une visite guidée de la ville où se tient l'Assemblée Générale).

2e jour :

Matin ou Après-midi : Séance administrative d'ouverture des Commissions (Bureaux et Membres Officiels) : Exposé des mesures prises par le Comité Exécutif et le Comité de Coordination. Exposé des programmes des Commissions.

3e jour et suivants : Réunions scientifiques.

a) Ces réunions se tiennent suivant le programme établi par le Comité de Coordination.

b) Le Comité Organisateur prendra les mesures pour répartir judicieusement les activités scientifiques et les distractions.

Dernier jour : Séance plénière de clôture ; Réunion du Bureau et du nouveau Comité de Coordination.

8.3. — En principe, le Bureau et le Comité Exécutif se réunissent trois fois au cours de la période de l'Assemblée Générale.

La dernière réunion du Comité Exécutif se tient dans la matinée du dernier jour réservé aux réunions scientifiques, pour établir les propositions à présenter à l'Assemblée Générale.

Immédiatement après la séance plénière de clôture a lieu une réunion du nouveau Bureau et du Bureau sortant avec les Présidents des Commissions sortants et les Présidents des Commissions nouvellement élus, pour la coordination du travail futur.

8.4. — Ordres du jour :

Les ordres du jour des réunions du Bureau, du Comité Exécutif et des séances plénières sont établis par le Secrétaire Général ; celui du Comité de Coordination est établi conjointement par le Comité Organisateur et le Secrétaire Général.

8.5. — Horaires des réunions :

(i) Les horaires des séances scientifiques des Commissions sont établis provisoirement par consultation du Comité de Coordination. Les séances ont une durée normale de deux heures.

(ii) Quatre mois avant la réunion, le Secrétaire Général invite les Présidents des Commissions à confirmer ce premier horaire ou à lui faire connaître les modifications qu'ils désireraient y voir apporter.

(iii) Les renseignements ainsi obtenus sont transmis au Comité Organisateur sous forme de projet de programme ; le Comité

Organisateur établit un programme en tenant compte des possibilités offertes par les locaux dont il dispose.

Il convient d'éviter autant que possible que des séances traitant de sujets voisins ou intéressant des disciplines voisines se tiennent simultanément. Il sera tenu compte à cet effet des possibilités réservées pour les séances mixtes entre deux ou plusieurs Commissions.

(iv) Le programme ainsi établi peut être revu par le Comité de Coordination immédiatement avant l'Assemblée Générale, si cela s'avère nécessaire.

9. — Programme pour les dames

Il convient que le Comité Organisateur nomme un Comité de Dames qui établira un programme de distractions pour les dames des participants et prendra les dispositions pour leur arrivée (fleurs, brochures descriptives, etc.).

10. — Informations et facilités

10.1. — Le Comité Organisateur est invité à prendre les dispositions nécessaires pour qu'un programme provisoire parvienne aux participants et soit publié dans le *Bulletin d'Information* au moins deux mois avant l'Assemblée Générale. Ce programme donne des renseignements sur les heures et lieux des réunions du Bureau, du Comité Exécutif et du Comité de Coordination prévues avant l'ouverture de l'Assemblée Générale ainsi que sur les séances d'ouverture et les inscriptions ; il doit également donner des informations sur les autres points d'intérêt pour l'Assemblée Générale. Ce programme mentionnera aussi les voies d'accès, les dispositions prises pour la réception des participants, leur logement, les facilités pour les repas, etc., ainsi que les dispositions concernant les prix et les devises. Il mentionnera encore les excursions projetées et le prix des voyages et excursions facultatives.

10.2. — Le Comité Organisateur fait connaître au Secrétaire Général le nombre de documents de chaque Commission nécessaire pour la distribution aux participants. Ce nombre est estimé par le Comité Organisateur, et communiqué au Secrétaire Général au moins 3 mois avant l'Assemblée.

10.3. — Il conviendrait, autant que possible, qu'au moment de leur inscription, les participants et les dames reçoivent :

1) un programme définitif (en anglais et en français),
2) un insigne de l'U.R.S.I.,
3) un insigne portant leur nom et l'indicatif de leur titre à l'U.R.S.I. (Bureau, Comité Exécutif, etc.),
4) une liste provisoire des participants et des dames.

Les participants devraient recevoir en outre :

5) une carte d'inscription portant leur numéro de casier,
6) un horaire provisoire des réunions des Commissions, et
7) les documents des Commissions pour lesquelles ils se sont inscrits dans le formulaire de participation.

10.4. — Seuls sont distribués les Rapports des Présidents, des Commissions, Sous-Commissions et Groupes de Travail et les communications dont la reproduction a été demandée au Secrétaire Général par les Présidents de Commissions. Il conviendrait que les Rapports des Comités Nationaux soient résumés dans les Rapports des Présidents de Commissions : ils seront publiés dans le Compte Rendu des Assemblées Générales.

Les rapports administratifs des Comités Nationaux ne sont pas reproduits.

11. — Liste des Participants

Au cours de l'Assemblée Générale, le Comité Organisateur, avec la collaboration des chefs des délégations nationales, établit et distribue la liste définitive des participants.

12. — Personnel

12.1. — Le Comité Organisateur devra prévoir :

a) Le personnel de réception pour l'accueil et l'inscription des participants, la distribution des documents (avant et pendant l'Assemblée Générale), les renseignements, etc.

b) Le personnel nécessaire pour assurer le fonctionnement des appareils de projection et des appareils sonores (voir 7.4).

c) Au moins six dactylographes équipées et connaissant, si possible, les deux langues officielles de l'U.R.S.I.

Ce personnel se trouve placé sous la surveillance générale du Secrétaire Général ou de ses adjoints qui veilleront à une répartition adéquate des travaux.

d) Le personnel nécessaire pour la reproduction des documents.

e) Le personnel nécessaire aux besoins du Comité Organisateur.

f) De commun accord entre le Comité Organisateur et le Secrétaire Général, une réunion de ce personnel sera organisée si possible pendant la période précédant l'Assemblée Générale ou bien pendant les deux premiers jours de l'Assemblée.

12.2 — Tous les travaux de dactylographie et de reproduction devront s'effectuer par l'intermédiaire du Secrétaire Général.

13. — Tenue a jour des Directives

Après la clôture de l'Assemblée Générale, le Comité Organisateur fait un examen critique des directives et communique ses commentaires et propositions de modification au Secrétaire Général qui, si cela s'avère nécessaire, les modifie après consultation du Bureau.

Recommandations aux Présidents des Commissions pour la préparation et l'organisation des Assemblées Générales

1. — Organisation et administration des Commissions

Conformément

(i) aux articles 7 et 8 des Statuts,

(ii) à l'article 14 du Règlement Intérieur,

(iii) aux articles 1 à 5 du Règlement des Commissions,

a) Les Commissions sont instituées et dissoutes, sur proposition du Comité Exécutif, par l'Assemblée Générale qui fixe le domaine de leurs activités.

b) Les Commissions sont constituées par un Bureau, des Membres Officiels, désignés par les Comités Nationaux (à raison d'un Membre Officiel par Commission), et des Membres Consultatifs nommés par les Commissions ; ceux-ci restent en fonctions jusqu'à la fin de l'Assemblée Générale qui suit leur désignation.

c) Le Bureau de chaque Commission comprend, en principe, un Président, élu par l'Assemblée Générale, un Vice-Président, ainsi qu'éventuellement deux Secrétaires (un de langue anglaise, l'autre de langue française). Le Vice-Président et les Secrétaires sont élus par les Membres Officiels de la Commission.

d) Les Présidents de Commission sont élus par l'Assemblée Générale sur proposition du Comité Exécutif. Ils entrent en fonction après l'Assemblée Générale qui a prononcé leur élection et 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 plus de deux termes consécutifs.

e) Le Président de chaque Commission est invité à communiquer au Secrétaire Général de l'U.R.S.I., au moins cinq jours avant la dernière réunion du Comité Exécutif, les propositions pour l'élection d'un nouveau Président ou pour sa propre ré-élection.

f) Les Commissions peuvent créer des Sous-Commissions pour étudier des sujets particuliers appartenant à leur domaine ; ces Sous-Commissions doivent être reconnues par l'Assemblée Générale.

g) L'attention des Présidents des Commissions est attirée sur la possibilité d'inviter aux Assemblées Générales des personnalités scientifiques appartenant à un pays ne faisant pas partie de l'U.R.S.I. (Règlement des Commissions, art. 18, Règlement intérieur, art. 25).

2. — Préparation de l'Assemblée Générale

2.1. — Au cours de l'année qui précède celle de l'Assemblée Générale, le Comité de Coordination (Membres du Bureau et Présidents des Commissions) se réunit pour établir un programme provisoire indiquant les sujets choisis pour être étudiés au cours de l'Assemblée Générale, le nombre et la date des réunions de chaque Commission, ainsi que des séances scientifiques mixtes et plénières.

2.2. — Au plus tard deux mois avant la réunion du Comité de Coordination chaque Président de Commission communique au Secrétaire Général la liste des sujets intéressant sa Commission, et susceptibles d'être discutés dans l'intérêt général lors de l'Assemblée Générale.

Ces listes sont communiquées par le Secrétaire Général aux Membres du Comité de Coordination.

2.3. — Le Secrétaire Général assure la diffusion du programme provisoire mentionné plus haut (2.1) aux Comités Nationaux et aux Membres Officiels des Commissions.

2.4. — Les Présidents des Commissions, après consultation, directe ou bien par l'intermédiaire du Secrétaire Général, choisissent pour chaque sujet un orateur qui ouvrira les débats par la présentation d'une communication donnant un aperçu *général* du sujet. Ils informeront le Secrétaire Général du choix qu'ils auront fait.

2.5. — Les communications mentionnées au 2.4 sont envoyées en trois exemplaires au Secrétaire Général de l'U.R.S.I. qui en transmet un au Président de la Commission intéressée.

2.6. — Seules les communications sollicitées et qui parviendront au Secrétaire Général au plus tard six semaines avant l'Assemblée Générale, seront reproduites et distribuées à l'Assemblée Générale. Les textes des communications doivent être conformes aux directives pour la préparation des rapports et des communications.

Les rapports des Comités Nationaux, des Commissions, des Sous-Commissions et des Groupes de Travail seront reproduits et distribués à l'Assemblée Générale.

2.7. — Le Secrétaire Général établit une liste de tous les documents présentés à chacune des Commissions.

2.8. — Il semble utile que chaque Président de Commission établisse, avant la réunion, un programme de travail pour sa Commission ; ce programme devrait être envoyé au Secrétaire Général au moins un mois avant la réunion de façon à en permettre la distribution au plus tard à l'ouverture de l'Assemblée Générale.

2.9. — Dans l'établissement de ces programmes, les Présidents de Commission tiendront compte des résolutions et recommandations adoptées au cours des Assemblées Générales précédentes, ainsi que des décisions prises à la réunion préparatoire du Comité de Coordination (2.1).

2.10. — Le Secrétaire Général attire l'attention des Présidents de Commission sur les Rapports Spéciaux en suspens.

2.11. — Dans le cas où l'un ou l'autre des Secrétaires de sa Commission serait empêché d'assister à la réunion, le Président est invité à désigner des Secrétaires provisoires remplaçant le ou les Secrétaires absents et à en informer le Secrétaire Général le plus rapidement possible.

2.21. — Le Secrétaire Général communique, le plus rapidement possible, aux Présidents les noms des Membres Officiels de leur Commission qui assistent à l'Assemblée Générale.

3. — Organisation de l'Assemblée Générale

3.1. — Les Membres des Bureaux des Commissions sont invités à assister à la réunion du Comité de Coordination qui se tiendra immédiatement avant l'ouverture de l'Assemblée Générale. Au cours de cette réunion, il sera procédé à l'établissement définitif du programme des séances scientifiques et les Présidents seront informés des décisions prises par le Comité Exécutif qui auraient une influence sur les travaux des Commissions.

3.2. — Cette réunion sera suivie, pour chaque Commission, d'une séance administrative à laquelle assisteront, outre les Bureaux des Commission, tous les Membres Officiels. Au cours de cette séance, les Présidents de Commission pourront donner connaissance de leur rapport sur l'activité de leur Commission depuis la dernière Assemblée Générale, exposer le programme des séances scientifiques ainsi que leurs vues sur la façon dont seront conduites ces séances, et prendre en considération l'élection du Bureau de la Commission (1*c*, *d*, *e*).

3.3. — L'examen du programme pourra conduire à la constitution de groupes de travail chargés d'étudier et d'établir des conclusions et des recommandations en vue du travail ultérieur ou d'actions coordonnées.

3.4. — Il est souhaitable que pour chacune des séances un rapporteur soit désigné ; il sera chargé d'établir un bref compte rendu de la séance résumant, tout au moins, les sujets mis en discussion et les conclusions. Ces comptes rendus seront rassemblés par les Secrétaires de Commission qui en assureront la traduction.

3.5. — Chaque Président de Commission est invité à désigner également un *Rédacteur Scientifique* chargé de la rédaction de la monographie qui donnera le compte rendu détaillé des réunions scientifiques. Ces monographies contiendront les communications introductives.

4. — Rapports, communications

La procédure suivante est conseillée :

4.1. — Les Présidents des Commissions pourraient se limiter à donner un court aperçu des Rapports des Commissions et Sous-Commissions qui seront distribués aux participants avant la séance d'ouverture de chacune des Commissions.

4.2. — Les rapports sur les activités des Comités Nationaux pourraient être considérés comme lus (voir 2.6).

4.3. — Les communications individuelles ne devraient être présentées que :

a) si les auteurs assistent à l'Assemblée,

b) si elles se rapportent à un des sujets choisis par le Président de la Commission et figurant sur la liste établie par le Comité de Coordination (2.1) ;

c) si elles parviennent au Secrétariat en temps voulu pour être communiquées au Président de la Commission intéressée, et reproduites.

4.4. — *Les Présidents sont invités à n'accepter aucune communication qui ne leur aurait pas été communiquée suivant les directives ci-dessus, ainsi que celles des Règles pour la présentation des rapports et communications.*

5. — Travaux découlant des séances

5.1. — Les Recommandations dont il est question au 3.3 sont la conclusion logique et effective des travaux des Commissions. Ces recommandations devraient être rédigées en français et en anglais et remises au Secrétaire Général au plus tard deux jours avant la séance de clôture de l'Assemblée Générale.

5.2. — Toutes les autres décisions prises par les Commissions doivent être communiquées au Secrétaire Général.

5.3. — Les Secrétaires de Commission sont invités à remettre le plus rapidement possible au Secrétaire Général les comptes rendus des séances en français et en anglais (voir 3.4).

5.4. — Les Présidents des Commissions sont priés d'informer le Secrétaire Général des mesures qu'ils désirent voir celui-ci prendre pour donner suite aux recommandations et résolutions prises par la Commission.

5.5. — *Les Présidents des Commissions sont invités à ne faire reproduire, au cours de l'Assemblée Générale, que les rapports des Commissions, Sous-Commissions et Groupes de travail sur les travaux s'étant déroulés dans le cadre de l'Assemblée Générale, les comptes rendus des séances, les résolutions et recommandations, à l'exclusion de toute communication individuelle qui leur serait présentée au cours de la réunion.*

6. — Renseignements et documents a fournir au Secrétaire Général

Les Présidents des Commissions sont invités à communiquer au Secrétaire Général :

6.1. — Avant l'Assemblée Générale :

1. La liste des sujets choisis (2.2).
2. Les noms des orateurs chargés d'ouvrir les débats (2.4).
3. Les communications à reproduire et à distribuer (2.5).
4. Le programme des travaux (2 8).
5. Le nom des rapporteurs (3.4) et, éventuellement, des Secrétaires provisoires (2.11).

6.2. — Avant la fin de l'Assemblée Générale :

6. Les recommandations soumises à l'approbation de l'Assemblée Générale (3.3 ; 5.1) y compris celles mentionnées aux 7.8 et 9 ci-après.
7. La liste des Sous-Commissions existantes à maintenir, avec leur mandat et leur composition.
8. La liste des nouvelles Sous-Commissions, avec leur mandat et leur composition.
9. Les sujets proposés pour des Rapports Spéciaux.

10. Les sujets proposés pour des symposia ainsi que les noms des organisateurs suggérés.
11. Les procès-verbaux des séances (3.4 et 5.3).
12. Les Rapports des Commissions, Sous-Commissions et Groupes de Travail.
13. Les propositions pour l'élection du Président de la Commission.
14. Les noms des Membres du Bureau, élus par la Commission (1.*d*).
15. La liste des Membres Consultatifs désignés au cours de l'Assemblée Générale (1.*c*).
16. Le nom du Rédacteur Scientifique choisi par la Commission (3.5)

6.3. — Après l'Assemblée Générale :

17. Les mesures à prendre par le Secrétaire Général pour donner suite aux recommandations du 6 ci-dessus, ou è d'autre décisions de la commission (5.4).
18. La liste des Membres Consultatifs désignés après l'Assemblée Générale.
19. Les propositions de modification à apporter aux « Recommandations aux Présidents des Commissions ».

7. — Comités

Les Présidents des Comités de l'U.R.S.I. pour lesquels des réunions sont prévues au cours de l'Assemblée Générale sont invités à suivre, autant que possible, les présentes Recommandations.

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

GENERAL ASSEMBLIES

The Guide for preparation and organization of General Assemblies and the Recommendations to Commission and Committee Chairmen issued in U.R.S.I. *Information Bulletin* No. 125 (March-April, 1961) have been revised taking into account the experience of those who took an active part in the preparation and organization of the XIVth General Assembly.

Guide for preparation and organization of General Assemblies

PRELIMINARY REMARK : This guide should be considered as directives aiming to facilitate the preparation and organization of General Assemblies ; it should be adapted to local circumstances.

1. — GENERAL ARRANGEMENTS COMMITTEE

1.1. — The National Committee of the country in which the General Assembly is to be held appoints a Committee, called the General Arrangements Committee whose duty is to examine all aspects of the conduct of the Assembly from the practical view point and in close collaboration with the Secretary General.

1.2. — It is recommended that the Committee be constituted of members each responsible for one particular aspect of the preparation and the organization of the Assembly, e.g. finances, scientific programme, accommodation and registration of delegates, conduct of the meetings, etc.

1.3. — The General Arrangements Committee is advised to constitute an Executive Board in order to ensure speedy and close connection with the Secretary General of the Union during the preparatory phase.

2. — CO-ORDINATING COMMITTEE

2.1. — A representative of the General Arrangements Committee should attend the meetings of the Co-ordinating Committee (Board of Officers and Commission Chairmen), when such meetings are dealing with the preparation or organization of a General Assembly.

2.2. — The task of the Co-ordinating Committee is to define the topics to be discussed in the Commissions during the General Assembly and to draft the Scientific programme of the Assembly.

2.3. — The Co-ordinating Committee will start functioning at the beginning of the year preceding that of the General Assembly. The Committee may be consulted by correspondence through the Secretary General.

3. — Finances

3.1. — Organizational expenses of the General Assembly are borne by the host country ; cost of duplication and distribution of scientific papers in advance of the Assembly are borne by U.R.S.I.

3.2. Travel expenses of some participants designated by the Board may be reimbursed by the Union, totally or partially.

3.3. — The National Committee of the host country is invited to inform the Secretary General of the names of participants, if any, to whom it might decide to allow pecuniary assistance.

4. — Dates

4.1. — The dates of the General Assembly are fixed approximately by the previous General Assembly. More precise dates are subsequently fixed by mutual agreement between the General Arrangements Committee and the Secretary General.

4.2. — Normally the General Assembly lasts at least ten working days. In principle it is preceded by a three-day period for administrative meetings of the Board of Officers, the Executive Committee, the Co-ordinating Committee, and of Commission Official Members.

5. — Participants to the General Assemblies

5.1. — Participants to the General Assemblies are as follows :

(*a*) *Official participants* :

(i) Honorary Presidents, Officers of the Board, Past Presidents ;

(ii) Chairmen, Vice-Chairmen and Secretaries of Commissions and Committees, Chairmen of Sub-Commissions and Working Groups officially recognized ;

(iii) Official and ordinary delegates appointed by National Committees (Statutes, art. 4).

(*b*) *Observers* invited by the President of U.R.S.I. or by the National Committee of the host country (the latter limited to personalities of the host country). Participation in anything else than technical sessions for persons in this last category is at the discretion of the General Arrangements Committee.

5.2. — The General Arrangements Committee prepares registration forms to be completed by those attending the General Assembly. A date will be mentioned before which they have to be returned to the General Arrangements Committee or to the General Secretary of U.R.S.I.

(*a*) The forms may be of different colours, one for participants in category (*a*), the other for those in category (*b*).

(*b*) They contain the name, address and title of the participant, and the names of accompanying family members.

(*c*) They further contain a list of U.R.S.I. Commissions, and eventually the list of scientific sessions to be held during the General Assembly. The participants are invited to specify the Commissions and the scientific sessions in which they are interested ; documents will be distributed with regard to those indications.

5.3. — The Secretary General provides the General Arrangements Committee with the names, addresses and position in U.R.S.I. of all individuals in categories (*a*). Invitations and forms are sent directly by the General Arrangements Committee to these persons ; the registration form should bear, when forwarded, the name and position in U.R.S.I. of the addressee. The General Arrangements Committee informs each National Committee of the names of addressees of that country to whom registration forms have been sent.

5.4. — National Committees inform the General Arrangements Committee and the Secretary General of U.R.S.I., not later than 8 months before the General Assembly of the persons appointed by them (*a*) as delegate to the Executive Committee in accordance with Art. 15 of Statutes (category (iii), (*b*) as official delegates in accordance with Art. 26 of Statutes category (iii). National Committees have the liberty to appoint as delegates (*a* and *b*) any personalities of their respective countries.

Invitations and forms are sent by the General Arrangements Committee to these persons as soon as such appointments are known.

5.5. — The General Arrangements Committee sends registration forms to observers (participants in category (*b*)) as soon as the

President of U.R.S.I. or the National Committee of the host country informs it of the nominees. It provides the Secretary General with a supply of forms for persons in category (*b*) invited by the President of U.R.S.I. A carbon copy of each invitation letter is sent to the General Arrangements Committee for information.

5.6. — National Committees whishing to invite as observers individuals of their country not in category (*a*) of Art. 5.1 should request the President of U.R.S.I. through the Secretary General to invite them. This does not apply to the National Committee of the host country. Commission Chairmen may proceed in the same way.

5.7. — Application forms received by the General Arrangements Committee not fulfilling the above conditions should be returned to the senders.

5.8. — The case of any individual registering for the General Assembly who has not properly applied for attendance will be submitted to the head of the delegation of his country who will decide whether this individual may be admitted or not, and, if he is admitted, whether he will be included among delegates or among observers. The case of individuals of a country not adhering to U.R.S.I. will be submitted to the Secretary General who will refer the matter to the President of U.R.S.I.

5.9. — Periodically the General Arrangements Committee sends to the Secretary General the list of persons who have applied for attendance. The Secretary General keeps informed the General Arrangements Committee of all application forms he has received and of invitations sent on behalf of the President of U.R.S.I.

6. — Accommodation and reception of participants

6.1. — The General Arrangements Committee is invited to help participants from abroad in securing accommodation and all information necessary for their stay.

6.2. — When indicated, the General Arrangements Committee will take the necessary steps in order to receive the participants from abroad at their arrival at the seat of the General Assembly.

7. — Rooms and Facilities for the General Assembly

7.1. — Facilities for the General Assembly should include, if possible :

— a reception hall,
— a cloakroom,
— a conversation room,
— a reading- and writing-room,
— a room for the President of U.R.S.I.,
— a room for the Secretary General and his staff,
— a room for the General Arrangements Committee,
— an office for typists,
— a meeting room for the Executive Committee and administrative sessions (about 30 people),
— a writing room for Commission and Committee Chairmen,
— a sufficient number of meeting rooms for Commissions and some rooms for working group sessions,
— an auditorium for plenary sessions.

7.2. — Facilities are provided by the General Arrangements Committee to serve drinks (tea, coffee, etc.) at appropriate times of day. If restaurants are lacking in the vicinity of the Assembly building provision is made for a snack-bar where small lunches can be served.

7.3. — The reception hall should contain :

(*a*) A reception and registration desk for participants, with appropriate staff.

(*b*) An information desk which should be ready to assist on travel matters, on banking and postal facilities for the participants. Some of the staff should speak several languages, and particularly the two U.R.S.I. official languages (French and English).

(*c*) A registration desk for parties and excursions.

(*d*) A distribution desk equipped with mail-boxes for each participant's documents and correspondence. In order to avoid errors, it is not advisable to allow the participants themselves to empty their mail-boxes. These are to be under

immediate control of the staff who hand out the papers on display of registration cards.

(*e*) Bulletin boards on which communications can be written or pinned. It is not advisable to allow participants themselves to pin communications. The bulletin boards should be under immediate control of the reception staff. All communications concerning the Assembly will be made through the Secretary General.

7.4. — All Commission lecture rooms are to be equipped with two blackboards at least. Some of these rooms are to be equipped with projection facilities. Such facilities include epidiascopes allowing projection of drawings. Although normal sizes are 8,5 × 8,5 cm (3,25 × 3,25″), 8,5 × 10 cm (3,25 × 4″) and 5 × 5 cm (2 × 2″), some requests may be expected for projection of drawings of 15 × 15 cm (6 × 6″) and of film strips of 24 × 36 mm and 18 × 24 mm.

It is also desirable to consider the use of film projector 16 mm and 8 mm (respectively for films 300 m and 75 m).

It is not necessary to have all equipment available in all lecture rooms simultaneously. However, it is desirable to consider the possibility that luminous projections will be needed for all Commission sessions simultaneously. The General Arrangements Committee will provide magnetophones (magnetic tape recorders) for scientific sessions and if necessary amplifiers and loud speakers for large rooms.

7.5. — The General Arrangements Committee provides for mimeographing documents during the Assembly (Commission, Sub-Commission and Working Group Reports). A copying machine will be at the disposal of the staff of the Secretary General if possible.

7.6. — Provision should be made for raising the U.R.S.I. flag at the entrance of the seat of the General Assembly.

8. — Typical programme

The following is a typical programme which may be modified by the General Arrangements Committee according to the wishes and possibilities.

8.1. — *Period preceding the General Assembly* :

1st day : Meeting of the Board of Officers,

2nd day : Meeting of the Executive Committee,

3rd day : Meetings of the Executive Committee and of the Co-ordinating Committee.

Registration of participants during this period.

8.2. — *General Assembly* :

1st day :

Morning : Registration of participants.

Afternoon : Inaugural Plenary Session (this will be followed by the raising of U.R.S.I. flag and eventually the taking of group photographs and by a sightseeing tour through the town where the Assembly is being held).

2nd day :

Morning or Afternoon : Opening Administrative Sessions of the Commissions (Officers and Official Members). Review of decisions reached by the Executive Committee and the Coordinating Committee. Review of Commission Programmes.

3rd day and following : Scientific Sessions.

(*a*) These are to be held according to the programme drafted by the Coordinating Committee.

(*b*) The General Arrangements Committee makes the necessary arrangements to ensure a suitable balance between scientific activities and social events.

Last day : Closing Plenary Session ; Meetings of the Board and of the new Coordinating Committee.

8.3. — In principle, three sessions are to be held by the Board of Officers and the Executive Committee during the General Assembly.

The last session of the Executive Committee takes place in the morning of the last day devoted to scientific sessions to draft the proposals to be submitted to the General Assembly.

A meeting of the incoming Board of Officers and the outgoing Officers with Commission Chairmen (incoming and outgoing) is

to be held immediately after the Closing Plenary Session in order to coordinate future activities.

8.4. — Agenda :

Agenda for meetings of the Board of Officers, the Executive Committee and also for plenary sessions are drafted by the Secretary General ; the agenda of the Coordinating Committee is drafted jointly by the General Arrangements Committee and the Secretary General.

8.5. — Timetable of sessions :

(i) Timetables of Commission scientific sessions are drafted provisionally through consultation of the Coordinating Committee ; sessions usually last two hours.

(ii) Four months before the meeting, the Secretary General asks the Commission Chairmen to confirm the provisional timetable or to inform him of the modifications they would wish to make.

(iii) Such indications are transmitted to the General Arrangements Committee as draft programme. The General Arrangements Committee drafts the programme taking into account the possibilities of the rooms.

Care should be taken to avoid conflict between sessions devoted to similar topics or interesting similar disciplines. The possibilities of joint sessions of two or several Commissions will be considered.

(iv) This programme may be revised by the Coordinating Committee immediately before the General Assembly if such action is felt necessary.

9. — Ladies' Programme

The General Arrangements Committee appoints a Ladies' Committee to set up a programme to entertain the ladies and make arrangements for their arrival (flowers, information booklets, etc.).

10. — Information and facilities

10.1. — The General Arrangements Committee makes arrangements to publish in the *U.R.S.I. Information Bulletin*, and to circulate to participants a provisional programme at least two

months before the General Assembly. This programme gives information on the time and places of the meetings of the Board of Officers, the Executive Committee, and the Coordinating Committee, to be held before the opening of the General Assembly, and also information on the opening sessions and registration. This provisional programme also gives some preliminary information on the other items of the programme. This mentions arrangements made for the reception of participants, accommodation, facilities for meals, etc., and information on prices and currencies.

Planned excursion and prices of alternative tours will be mentioned in the programme.

10.2. — The General Arrangements Committee informs the Secretary General of the number of documents of each Commission requested by participants. This number is estimated by the General Arrangements Committee and forwarded to the Secretary General at least 3 months before the Assembly.

10.3. — Upon registering, participants and the ladies are provided with :

(1) a final programme (in English or in French),

(2) an U.R.S.I. badge,

(3) a name pin (with name and title in U.R.S.I. : Board of Officers, Executive Committee, etc.),

(4) a provisional list of participants and ladies.

Participants are also provided with :

(5) an identity card with number of pigeonhole,

(6) a provisional timetable of Commission sessions,

(7) documents of the Commissions for which they asked in the registration form sent in advance.

10.4. — Only the following documents are distributed : Reports from Commissions, Sub-Commissions and Working Groups Chairmen, and papers whose reproduction has been requested by the Commission Chairmen. National Committee Reports should be summarized in the Reports of the Commission Chairmen, they will be published in the Proceedings of the General Assembly. National Committee Administrative Reports are not reproduced.

11. — List of Participants

During the General Assembly, the General Arrangements Committee drafts and distributes the final list of participants with the cooperation of the heads of National Delegations.

12. — Staff

12.1. — The General Arrangements Committee provides the following staff :

(*a*) Personnel for reception and registration of participants, distribution of documents (before and during the General Assembly), providing information, etc.

(*b*) Personnel to operate equipment mentioned in 7.4.

(*c*) At least six typists, as far as possible speaking the two official languages of U.R.S.I.

This staff is under the general supervision of the Secretary General or of his assistants who will take care of a suitable distribution of work.

(*d*) Personnel for reproduction of documents.

(*e*) Personnel needed for the use of the General Arrangements Committee.

(*f*) With mutual agreement of the General Arrangements Committee and of the Secretary General of U.R.S.I., a meeting of the staff shall be arranged if possible during the period preceding the General Assembly or during the two first days of the Assembly.

12.2. — All typing and reproduction work are made through the Secretary General.

13. — Revision of the Guide

After the close of the General Assembly, the General Arrangements Committee shall consider the Guide and forward its comments and proposals to the Secretary General, who will take in agreement with the Board of Officers the necessary steps to modify the text if needed.

Recommendations to Commission Chairmen for preparation and organization of General Assemblies

1. — Organization and administration of Commissions

In accordance with :

(i) articles 7 and 8 of the Statutes,

(ii) article 14 of the Bylaws,

(iii) articles 1 to 5 of the Rules for Commissions,

(*a*) Commissions are established and abolished on the proposal of the Executive Committee, by the General Assembly which, determine the fields of their activities.

(*b*) The Commissions are composed of Officers, Official Members appointed by National Committees (each of which may appoint one Official Member for each Commission) and of Consultants designated by the Commission. The Consultants retain their office until the end of the General Assembly following their appointment.

(*c*) The Officers of each Commission include generally a Chairman, elected by the General Assembly, a Vice-Chairman and one or two Secretaries (one English speaking and one French speaking). The Vice-Chairman and the Secretaries are elected by the Official Members of the Commission.

(*d*) Chairmen of Commissions are elected by the General Assembly on the proposal of the Executive Committee. They 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.

(*e*) The Chairman of each Commission is invited to communicate to the Secretary General of U.R.S.I., at the latest five days before the last meeting of the Executive Committee the proposals for election of a new Chairman or for his own re-election.

(*f*) Commissions have power to establish Sub-Commissions to study particular topics within their scope ; these Sub-Commissions must be recognized by the General Assembly.

(*g*) The attention of the Commission Chairmen is called to the possibility of inviting to General Assemblies scientists from countries not adhering to U.R.S.I. (Rules for Commissions, art. 18 ; Bylaws, art. 25).

2. — Preparation of the General Assembly

2.1. — During the year preceding the General Assembly, at a meeting of the Coordinating Committee (Members of the Board and Commission Chairmen) a provisional programme is drafted mentioning the selected topics to be considered during the General Assembly, the number and dates of sessions of each Commission and also of the joint and plenary scientific sessions.

2.2. — At least two months before the meeting of the Coordinating Committee, each Commission Chairman should send to the Secretary General a list of subjects in the field of his Commission suitable for general discussion at the General Assembly. These lists are circulated by the Secretary General to the Members of the Coordinating Committee.

2.3. — The Secretary General circulates the provisional programme established as mentioned in 2.1 to National Committees and to Official Members of the Commissions.

2.4. — Commission Chairmen, after consultation directly or through the Secretary General of their Official Members, select for each topic one speaker who shall open the discussion in submitting a *general* review on the topic. They should inform the Secretary General of the names of the speakers.

2.5. — Papers mentioned in 2.4 should be sent in triplicate to the Secretary General of U.R.S.I. who will send a copy to the Chairman of the relevant Commission.

2.6. — Only invited papers reaching the Secretary General at the latest six weeks before the General Assembly will be reproduced and distributed at the General Assembly. These papers should be submitted according to the Rules for Submission of Reports and Papers.

Commission, Sub-Commission and Working Group Reports will be reproduced in extenso and distributed at the General Assembly. National Committee Reports should be summarized in the Commission Chairman Report, they will be published in the Proceedings of the General Assembly.

2.7. — The Secretary General drafts a list of all documents submitted to each Commission.

2.8. — It seems useful that a working programme be drafted before the General Assembly by each Commission Chairman, in order to have it circulated at the latest at the beginning of the Assembly.

2.9. — Such programmes should be drafted taking into account Resolutions and Recommendations adopted during the previous General Assemblies, and also by Recommendations of the Coordinating Committee (see 2.1).

2.10. — The Secretary General draws the attention of the Commission Chairmen to the outstanding Special Reports.

2.11. — In the case one of the Secretaries (or both) should be prevented to take part to the General Assembly, Chairmen are requested to appoint temporary Secretaries to take the place of the defaulting Secretary or Secretaries, and to inform as soon as possible the Secretary General of such appointments.

2.12. — The Secretary General keeps the Commission Chairmen as soon as possible informed of the Official Members of their respective Commission attending the General Assembly.

3. — Organization of the General Assembly

3.1. — Commission Officers are invited to the meeting of the Coordinating Committee which is held just before the opening of the Assembly. During this meeting the final programme of the scientific sessions will be drafted and information will be given on decisions of the Executive Committee which might affect the work of the Commissions.

3.2. — After this meeting each Commission will hold an administrative session for Officers and Official Members of the Commis-

sions ; during this session Chairmen should deliver their report on the Commission activity since the last General Assembly, announce the programme of the scientific sessions and their suggestions on the way to hold such sessions and consider the election of Commission officers (1*c*, *d*, *e*).

3.3. — Consideration of the programme may lead to set up working parties to consider and formulate recommendations concerning further work or action in cooperate measures.

3.4. — It is desirable that for each of the scientific session a Reporter be designated to draft short minutes of the session summarizing at least the subject discussed and the conclusions of the discussions. Such minutes should be collected by the Commission Secretaries who will translate them.

3.5. — Each Commission Chairman is asked to appoint a Scientific Editor to draft the Monograph giving comprehensive proceedings of the scientific sessions. Such monographs will include the introductory papers.

4. — Reports, papers

It seems advisable that :

4.1. — Summaries only of Reports of Commissions and Sub-Commissions be read, the full text being distributed before the opening session of each Commission.

4.2. — Progress Reports of National Committees be considered as read (see 2.6).

4.3. — Individual papers should not be discussed unless :

(*a*) their authors are present ;

(*b*) they deal with one of the topics suggested by the Chairman of the Commission and mentioned on the list drafted by the Coordinating Committee (2.1) ;

(*c*) the papers have reached the General Secretariat in time to be communicated to the Chairman of the concerned Commission.

4.4. — *Chairmen of Commissions are requested to reject any papers which do not fulfil the above requirements and also those of the Rules for Submission of Reports and Papers.*

5. — Work arising from the sessions

5.1. — Recommendations mentioned in 3.3 seem to be the logical conclusions of the work carried out by the Commissions. It seems desirable that such recommendations be drafted both in English and French languages, and handed to the Secretary General at the latest two days before the closing session of the Assembly.

5.2. — Any other decisions taken by the Commissions should be communicated to the Secretary General.

5.3. — Commission Secretaries should communicate as soon as possible to the Secretary General the minutes of the sessions both in English and in French languages.

5.4. — Commission Chairmen are kindly requested to keep the Secretary General informed of any steps to be taken in order to fulfil the resolutions and recommendations of their Commission.

5.5. — *Commission Chairmen are requested to ask during the General Assembly only for reproduction and distribution of Commission, Sub-Commission and Working Group reports on work carried out during the Assembly, minutes of sessions, resolutions and recommendations; any individual papers submitted during the Assembly should be excluded.*

6. — Information and documents to be communicated to the Secretary General

Commission Chairmen are kindly requested to provide the Secretary General with the following information.

6.1. — Before the General Assembly :

1. List of selected topics (2.2).
2. Names of the introductory speakers (2.4).
3. Papers to be reproduced and distributed (2.5).
4. Working programme (2.8).
5. Names of reporters (3.4) and if needed of temporary Secretaries (2.11).

6.2. — Before the end of the General Assembly :

6. Recommendations submitted to the approval of the General Assembly including those mentioned in 7, 8 and 9 (3.3, 5.1).
7. The list of existing Sub-Commissions to be maintained, with terms of reference and membership.
8. The list of new Sub-Commissions, with terms of reference and membership.
9. Topics proposed for Special Reports.
10. Topics proposed for symposia and suggested names of organizators.
11. Minutes of the sessions (5.3).
12. Commission, Sub-Commission and Working Group Reports.
13. Nominations for the election of the Commission Chairman (1.8).
14. The names of the Officers elected by the Commission.
15. The list of Consultants appointed by the Commission during the General Assembly.
16. The name of the Scientific Editor appointed by the Commission (3.5).

6.3. — After the General Assembly :

17. Steps to be taken by the Secretary General to fulfil the recommendations mentioned in 6) above, or other decisions of the Commission.
18. The list of Consultants appointed by the Commission after the General Assembly.
19. Suggestions for modifications to the « Recommendations to Commission Chairmen ».

7. — Outstanding Committees

Chairmen of U.R.S.I. Committees for which sessions are provided for during the General Assembly are asked to follow as much as possible the above recommendations.

The Secretary General,
(*sgd*) E. Herbays.

NATIONAL COMMITTEES

Germany

NATIONAL COMMISSION CHAIRMEN

Commission I : Prof. Dr. U. Adelsberger, Physikalisch-Technische Bundesanstalt, 33 Braunschweig, Bundesallee 100.

Commission II : Dr. J. Grosskopf, Fernmeldetechnisches Zentralamt, 61 Darmstadt, Rheinstr. 110.

Commission III : Dr. W. Becker, Max-Planck Institut für Aeronomie, 3411 Lindau, P. B. 20.

Commission IV : Prof. Dr. A. Ehmert, Max-Planck Institut für Aeronomie, 3411 Lindau, P. B. 40.

Commission V : Prof. Dr. O. Hachenberg, Sternwarte der Universität, 53 Bonn, Poppelsdorfer Allee 49.

Commission VII : Dr. W. Veith, Siemens und Halske AG, Wernerwerk für Bauelemente, 8 München 9, St. Martin-Str. 76.

Japan

Membership

Mr. Aono, Yuichiro, Radio Research Laboratories, Ministry of Posts and Telecommunications.

Prof. Asami, Yoshihiro, Faculty of Engineering, Seikei University, *Official Member, Commission VII*

Dr. Fujita, Tokuya, Technical Research Laboratories, Japan Broadcasting Corporation.

Prof. Goto, Motinori, Tokyo Institute of Technology.

Dr HATOYAMA, George Michio, Research Laboratory, Sony Corporation.

Dr. IKEGAMI, Fumio, Electrical Communication Laboratories, Nippon Telegraph and Telephone Public Corporation.

Dr. IMAI, Ichiro, Meteorological Research Institute.

Prof. IWAI, Akira, Research Institute of Atmospherics Nagoya University.

Prof. KIMPARA, Atsushi, Dept. of E.E., Nagoya University, *Chairman of the Japanese National Committee*

Prof. KOGA, Isaac, Research Laboratory, Kokusai Denshin Denwa Co. (Japan's Overseas Radio and Cable System), President, U.R.S.I.

Dr. KOONO, Tetsuo, Radio Research Laboratories, Ministry of Posts and Telecommunications, *Official Member, Commission II*

Prof. MAEDA, Ken-ichi, Faculty of Engineering, Kyoto University.

Prof. MIYADI, Masasi, Professor Emeritus, University of Tokyo.

Prof. MORITA, Kiyoshi, Oki Electric Industry Co, *Official Member, Commission VI*

Prof. NAGATA, Takesi, Geophysical Institute, University of Tokyo, *Official Member, Commission IV*

Dr. NAMBA, Shogo, Kokusai Denshin Denwa Co. (Japan's Overseas Radio and Cable System), *Official Member, Commission III*

Mr. NOMURA, Tatsuji, Technical Research Laboratories, Japan Broadcasting Corporation.

Prof. OBAYASHI, Tatsuzo, Ionospheric Research Laboratory, Kyoto University.

Prof. OKAMURA, Sogo, Dept. of E. E., University of Tokyo, *Official Member, Commission I, Secretary of the Japanese National Committee*

Dr. OMORI, Shunichi, Electrotechnical Laboratory, Ministry of International Trade and Industry.

Prof. SAITO, Shigebumi, Institute of Industrial Science, University of Tokyo.

Prof. SHIMODA, Koichi, Dept. of Physics, University of Tokyo.

Dr. SHINKAWA, Hiroshi, Research Laboratory, Kikusai Denshin Denwa Co. (Japan's Overseas Radio and Cable System.) *Official Member, Subcommission on Atmospheric Noise*

Dr. SOMEYA, Isao, Electrical Communication Laboratories, Nippon Telegraph and Telephone Public Corporation.

Prof. TAKAHASHI, Hidetosi, Faculty of Science, University of Tokyo.

Prof. TAKAKUBO, Keiya, Astronomical Institute, Tohoku University.

Dr. TAKAKURA, Tatsuo, Tokyo Astronomical Observatory, University of Tokyo.

Prof. TAKI, Yasuo, Dept. of E. E., University of Tokyo.

Prof. TANAKA, Haruo, Research Institute of Atmospherics, Nagoya University, *Official Member, Commission V*

Dr. UYEDA, Hiroyuki, Radio Research Laboratories, Ministry of Posts and Telecommunications.

Dr. YONEZAWA, Toshiyuki, Radio Research Laboratories, Ministry of Posts and Telecommunications.

Pologne

LISTE DES MEMBRES OFFICIELS

Commission I : Prof. Dr. Stanislaw RYZKO, Université Technique de Varsovie, Pl. Jednosci Robotniczej 1, Varsovie.

Commission II : Prof. Sylwester JARKOWSKI, Institut de Télécommunication à Varsovie, ul. Szachowa 1, Varsovie-Miedzeszyn.

Commission III : Prof. Stefan JASINSKI, Institut de Télécommunication à Varsovie, ul. Szachowa 1, Varsovie-Miedzeszyn.

Commission IV. : Prof. Stefan MANCZARSKI, Directeur du Laboratoire de Géophysique de l'Académie Polonaise des Sciences à Varsovie, ul. Pasteura 3, Varsovie.

Commission V : Prof. Dr. Wilhelmina IWANOWSKA, Membre correspondant de l'Académie Polonaise des Sciences, Université Nicolas Kopernik de Torun, ul. Sienkiewicza 30, Torun.

Commission VI : Prof. Dr. Krystyn Bochenek, Institut des Problèmes Techniques Fondamentaux à Varsovie, ul. Swietokrzyska 21, Varsovie.

Commission VII : Prof. Dr. Adam SMOLINSKI, Membre correspondant de l'Académie Polonaise des Sciences. Université Technique de Varsovie, Pl. Jednosci Robotniczej, Varsovie.

COMMISSIONS ET COMITÉS

Commission I. — Mesures et Etalons Radioélectriques

TEMPS UNIFORME ET FRÉQUENCE CONSTANTE POUR L'ANNÉE 1964

(Information publiée dans le *Journal des Télécommunications*, Vol. 32, n° 2, février 1964, p. 34)

D'après les décisions de la Commission internationale de l'heure de l'Union astronomique internationale (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 l'Assemblée plénière du Comité consultatif international des radiocommunications (C.C.I.R.) à Genève, en janvier-février 1963, le Bureau international de l'heure (B.I.H.), 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 1964

$$-150 \times 10^{-10}$$

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

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

La valeur indiquée ne changera pas au cours de l'année 1964.

La Commission internationale de l'heure, l'U.R.S.I. et le 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 — Bureau international de l'heure.

Commission I
on Radio Standards and Measurements

UNIFORM TIME AND CONSTANT FREQUENCY FOR 1964

(Information published in Telecommunication Journal,
Vol. 31, n 2, February 1964, p. 34*)*

Following the decisions reached by the International Time Committee of the International Astronomical Union (I.A.U.) (Berkeley, August, 1961), the General Assembly of the International Scientific Radio Union (U.R.S.I.) (London, September, 1960) and the Plenary Assembly of the International Radio Consultative Committee (C.C.I.R.) (Geneva, January-February, 1963), the International Bureau of Time (B.I.H.), after consultation with observatories using cesium atomic resonators and comparison of their astronomical observations, has worked out the nominal value of the frequency to be transmitted in 1964.

$$-150 \times 10^{-10}$$

in respect of a time scale such that the cesium frequency is equal to :

$$f(Cs) = 9\ 192\ 631\ 770\ c/s$$

This value will remain unchanged throughout the year 1964.

The International Time Committee, U.R.S.I. and the C.C.I.R. recommend that the frequency indicated by the International Bureau of Time should be used by organizations wishing to transmit uniform time and a constant frequency — Bureau international de l'heure.

Commission III. - Ionosphere

THE USE OF THE OGO-A SATELLITE FOR IONOSPHERIC STUDIES

(From *I.Q.S.Y. Notes*, nº 6, March 1964)

The following information about OGO-A has been kindly provided by the Secretary of the I.Q.S.Y. Committee in the U.S.A. in order that interested workers in other countries may make use of the facilities.

The first Orbiting Geophysical Observatory (OGO-A), which N.A.S.A. plans to launch in the third quarter of 1964, will contain a radio beacon transmitter for ionospheric studies as part of a joint experiment to be performed by the National Bureau of Standards (R. S. Lawrence, Ionospheric Radio Astronomy Section) and Stanford University (O. K. Garriott, Radioscience Laboratory). The experiment will permit long-term studies of the electron content of the ionosphere and of the exosphere, and also a new approach to the investigation of ionospheric irregularities.

The orbit of OGO-A will have the following parameters : 110,000 km apogee, 275 km perigee, 31° inclination, and 43,1 hour period. The satellite will maintain, within 2°, the same orientation with respect to the center of the earth at all times. The satellite will be observed near its apogee position for a large fraction of each orbit. Electron content can be measured continuously for many hours over much of the earth's surface and the drift of ionospheric irregularities across the ray path will be readily observed.

The transmitter will radiate modulated CW signals at coherent carrier frequencies of 40.010 and 360.090 Mc/s ; 20.0 and 200.0 kc/s modulation will be applied to both carriers simultaneously. The table below gives the transmitter output power and the expected transmitter antenna gain in the direction of the earth center in db above an isotropic radiator. The figures for the modulations are for one sideband only ; the total transmitter output is 990 mw. The signals will be plane polarized and non-rotating.

OGO-A Satellite

	40 Mc/s			360 Mc/s		
	Carrier	±200 kc/s	±20 kc/s	Carrier	±200 kc/s	±20 kc/s
Transmitter output (mw)	230	230	55	125	20	12.5
Transmitting antenna gain (db)	+2.0	+2.0	+2.0	+8.0	+8.0	+8.0

Electron content will be calculated in two ways : the first depending upon the frequency dispersion of radio-wave propagation in the ionosphere, and the second depending upon the rotation of polarization in the ionosphere (the Faraday effect). In the first method, the phase of the 20 kc/s modulation envelope on the 40 Mc/s carrier will be compared with the phase of the 20 kc/s modulation envelope on the 360 Mc/s carrier. The modulation on the 40 Mc/s carrier will be found to be delayed with respect to the 360 Mc/s carrier because of the decreased group velocity at the lower carrier frequency. The relative phase shift of the modulation will then be related to the electron density integrated along the ray path between observer and satellite.

The second method involves measurement of the angle between the planes of polarization at 39.8, 40.0 or 40.2 Mc/s at the observing station. This « differential Faraday rotation angle » will then be related to the electron content but, in this case, the resulting integral is weighted by the strength of the earth's magnetic field. Since the intensity of the earth's field decreases so rapidly with height, electrons at altitudes greater than a few thousand kilometers are almost « overlooked » in this method. The difference between the measurement just described and the group delay measurement above gives the electron content of the exosphere above the « ionosphere » as the term is usually understood.

The phase of the 40 Mc/s carrier will be compared with the phase of the 360 Mc/s carrier after it has been divided by nine. In this way, very small changes in electron content may be studied. Also, the change in the polarization angle at any one of the frequency components near 40.0 Mc/s reveals changes of electron content in the ionosphere. Changes in addition to the usual diurnal variation are to be expected for a variety of reasons ; solar flares, magnetic storms, spread-F conditions and the horizontal drift of irregularities should all produce observable effects.

Because of power restrictions in the space-craft, it has been necessary to keep the radiated power levels relatively low. Therefore, it is necessary to use very sensitive equipment if all of the measurements above are to be accomplished. Phase-locked receivers with locked-loop bandwidths of 5 cps or 15 cps are now under construction and receiving antenna gains of about 10 db at 40.0 Mc/s and 17 db at 360 Mc/s are planned ; overall S/N

ratios of 10 db or better are then expected. However, the Faraday rotation experiments can be accomplished with much less complexity if a separate, stable receiver is tuned to each of the spectral components : 39.8, 40.0 and 40.2 Mc/s. With BFO in use and a narrow audio filter on the output, adequate S/N ratios should be obtainable. Some returning will, of course, be necessary as the Doppler shift changes but this will occur very slowly when the satellite is near apogee.

Several references are suggested below for those who wish to investigate the methods described above in more detail.

DANIELS, F. B., 1957. — *Scientific Uses of Earth Satellites* (ed. J. A. Van Allen), pp. 276-282, University of Michigan Press, Ann Arbor, U. S. A.

GARRIOTT, O. K. and LITTLE, C. G., 1960 — « The Use of Geostationary Satellites for the Study of Ionospheric Electron Content and Ionospheric Radio-Wave Propagation », *J. Geophys. Res.*, **65** (7), 2025.

ESHLEMAN, V. R. et *al.*, 1960. — « Radar Methods of Measuring Cislunar Electron Density ». *J. Geophy. Res.*, **65** (10), p. 3079.

Permanent Sub-Commission on Radio Noise of Terrestrial Origin

TERMS OF REFERENCE

The following terms of reference have been proposed by Prof. A. Kimpara, Chairman of the Sub-Commission, and approved by the Board of Officers of U.R.S.I.

Considering the importance of the study of atmospheric radio noise, its relationship to the meteorological factors in the source, its propagation along the earth and through the ionosphere and magnetosphere, ist influence on radio communications and the whistling atmospherics, with particular reference to the characteristics of the source and the propagation through the ionosphere and the magnetosphere, the following terms of reference for Sub-Commission on Radio Noise of Terrestrial Origin are recommended.

1. *Frequency spectrum of Atmospherics.* — It is recommended

that observations be made of the frequency spectrum (UHF to MLF) of atmospherics, close to the source and at various distances, with the object of studying (*a*) the characteristics ol cloud-cloud and cloud-ground discharges and (*b*) the propagation of VLF waves.

2. *Localization of the Sources of Atmospherics.* — It is recommended that investigations be made of effective methods to localize exactly the sources of atmospherics, with a view to (*a*) studying the propagation of atmospherics, (*b*)the stormy weather forecasting and (*c*) the geographical distribution of sources.

3. *Intensity of Atmospherics.* — It is recommended that continuous observations be made of (*a*) the characteristics of atmospherics and (*b*) the amplitude and phase of VLF signals, with a view to studying solar and geophysical influences on the propagation of atmospherics. (In collaboration with Commission III.)

4. *Interference caused by the noise to Radiocommunications.* — It is recommended that the characteristics of atmospherics be investigated statistically and be used to predict the degree of disturbance to various types of communication systems, with a view to minimize the disturbance of radio communications due to atmospherics.

5. *VLF noise phenomena.* — It is recommended that (*a*) the origin of VLF emissions and (*b*) their propagation be investigated to bridge the gap between geomagnetic micropulsations and the low-frequency end of the spectrum of atmospherics. (In collaboration with main Commission IV.)

6. *Whistlers and VLF noises.* — It is recommended that the dispersion, intensity, bearing, angle of arrival, polarization etc., of whistlers be observed, the special characteristics of lightning discharges, which produce whistlers, be examined ; the theory of whistler-mode propagation be developed and applied to the propagation of magnetospheric VLF emissions. (In collaboration with main Commission IV.)

7. *New unknown radio noise phenomena.* — Provision should be made for the investigation and discussion of any radio noise phenomena, not at present known, which may be detected in the near future.

THE SUBMISSION OF DATA ON ATMOSPHERIC RADIO NOISE TO WORLD DATA CENTRES

(From IQSY Notes nº 6, March 1964)

During the I.Q.S.Y. Assembly in Rome in March 1963,Workking Group V on Ionosphere prepared a report in which Section 5 refers to the desirability of carrying out measurements of atmospheric radio noise, during the I.Q.S.Y., along lines broadly similar to those adopted during the I.G.Y., with one or two additional features. (See I.Q.S.Y. Notes No. 3, p. 37). The submission of data to the World Data Centres is referred to in I.Q.S.Y. Instruction Manual No. 6, p. 34, Section 3.2.4. but, in the light of experience, it seems desirable to introduce some modifications to the earlier recommendations.

Atmospheric noise differs from many other topics studied in the ionospheric discipline in that variations from day to day tend to depend on local or regional, rather than on world-wide, features. Although there is less general demand for detailed results, summaries are required in a standardized form which will show the diurnal and seasonal changes.

It is therefore proposed that the World Data Centres should contain mainly these summaries, but with sufficient additional information to indicate what detailed data also exist. Any demands for particular results could then be met by direct correspondence between the organizations concerned. With this reduction in the amount of data requested from experimenters, it is hoped that the records in the Data Centres will provide a more complete, though less detailed, source of information for the I Q.S.Y. than they did for the I.G.Y.

Of the types of data listed in the recommendations for the I.G.Y. (Annals of the I.G.Y., Vol. III, Part IV, p. 313) the submission of the following to the ionospheric Data Centres is proposed for each recording station.

1. — *Amplitude Data.*

(*a*) Monthly median, lower decile and upper decile values of individual paramters for each hour of the day, at eachf frequency.

(*b*) Frequencies, dates and times of day for which amplitude probability distributions have been recorded.

(*c*) Frequencies, dates and times of day for which amplitude distributions of noise peaks or of crossing rates have been recorded.

2. — *Film and magnetic tape records.*

Frequencies, dates and times of records.

3. — *Lightning-flash counter data,*

Although flash-counter data are submitted to the WMO and to the meteorological Data Centres, it would be useful to have some details of the available data in the ionospheric Data Centres also. A suitable summary for each location would include a total monthly count of flashes for each hour of the day, together with details of the installation. The number of days on which observations were made at each hour will be needed if the records are incomplete.

Data from « sferics » networks will be available in the meteorological Data Centres and as they are submitted on a routine and continuous basis, no notes about them are necessary in the ionospheric Data Centres.

4. — *VLF noise measurements.*

Measurements of noise at about 27 kc/s will be made more extensively during the I.Q.S.Y. than during the I.G.Y., mainly on a routine basis. These results are also to be submitted to the meteorological Data Centres, but the ionospheric Data Centres should also contain records of the periods for which data are available.

F. HORNER.
U.R.S.I.-C.I.G. consultant for atmospheric radio noise.

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

REPORT OF THE LINDAU MEETING ON OBLIQUE SOUNDINGS OF THE IONOSPHERE

May 6.-10., 1963

The above meeting was called to consider the present state of oblique soundings and to make recommendations for future work. This included a study of the following problems :

(1) Data interchange, scaling procedures and terminology.

(2) Equipment.

(3) Ray tracing.

(4) Scientific uses.

(5) Applications to communication systems.

The following recommendations were made :

1. — Data Interchange, Scaling Procedures and Terminology

1.1. — *Data exchange.*

It is recommended that small amounts of data, for periods of special interest, be made available by those organizations operating oblique sounders. For this purpose it is recommended that all such organizations inform the I.Q.S.Y. Reporter for the Ionosphere of their sounding schedules and equipment characteristics (power level, make of sounder, antenna details). This information will be published in the I.Q.S.Y. Notes. Requests for data should then be made directly to the organization concerned.

1.2. — *Terminology.*

It was recognised that, for purposes of data interchange, a need exists for the standardization of certain terms. As a first step in this direction the following recommendations are made.

1.2.1. — That capital letters be used in oblique work in order to distinguish it, as for as possible, from vertical work in which small letters are often used (e.g. f for frequency, h for height, etc.).

1.2.2. — In view of the ambiguity in the meaning of « usable » the term maximum usable frequency (MUF) should be eliminated in the description of oblique-incidence ionograms.

1.2.3. — The use of the word « virtual path » should refer to the time of flight (group delay) in oblique propagation work.

1.2.4. — In ray tracing the following symbols are suggested :

t = the angle of elevation at the transmitter (the take-off angle)

r = the angle of elevation at the receiver (angle of arrival),

o = the angle of incidence between ray and radius vector at the point of entry into the ionosphere,

i = the angle between ray path and the radius vector at any point along the path,

= the angle between the radius vector and the extension of the linear ray path below the ionosphere, at the actual height of reflection,

a = the « apex » angle between the radius vector through the point of reflection (midpoint) and the extension of the linear ray path.

The following terminology is suggested for the description of path structure.

1.2.5. — For propagation paths involving reflections by different layers, the reflections (or hops) should be specified in order of their position with respect to the transmitter. Thus 5E — 3F2 indicates 5 reflections from the E layer near the transmitter followed by 3 reflections from the F2 layer.

1.2.6. — The use of a dash is convenient for the representation of a ground reflection, The absence of a dash will then show up M-type ray paths and « supermodes ». For example F — E*s* — F2 represents an F layer hop followed by ground reflection to the lower side of the E2 layer and finally back to ground. Of the other hand F E_sF2 represents an M-type path in which the ray is reflected from the F layer to the upper side of the E_s layer, back up to the lower side of the F2 layer and down to the ground. The symbol F2F2 means an F2 reflection followed by another F2 reflection without an intermediate ground reflection (supermode).

1.3. — *Scaling Procedures.*

The following terms are suggested for the description of oblique ionograms.

1.3.1. — MOF (maximum observed frequency) means the highest frequency on which the sounder transmitter signals are *observed* on the ionogram, regardless of the propagation path involved.

1.3.2. — LOF (lowest observed frequency) means the lowest frequency on which the sounder transmitter signals are *observed* on the ionogram, regardless of the propagation path involved.

1.3.3. — These terms (MOF and LOF) may be used also to describe identifiable modes. For example 2F2 LOF means the lowest frequency (observed on the ionogram) which is propagated by two reflections at the F2 layer and an intermediate ground reflection. The 2F2 MOF means the highest observed frequency which is associated with 2 hop F2 propagation, regardless of whether the signal is propagated by refraction, by scatter, or by a combination of both mechanisms.

1.3.4. — The lowest observed frequency of the high angle ray may be distinguished from that of the low angle ray by the letters H and L respectively. Thus 2F2 HLOF is the lowest frequency (observed on the ionogram) of the signal which is propagated via the high-angle two-hop F2 path and 2F2 LLOF is the lowest frequency (observed on the ionogram) of the signal which is propagated by the low-angle 2-hop F2 path.

1.3.5. — The one-hop modes do not need the number 1 (one) in front. For example F2 LLOF means the low angle ray LOF for the one hop F2 ray path.

1.3.6. — When it is required to distinguish between the ordinary and extraordinary ray paths an « *o* » or « *x* » may follow in parentheses. The F2 MOF(*x*) is the maximum observed frequency of the extraordinary wave which is reflected once at the F2 layer.

1.3.7. — Often the MOF for an identifiable path is greater than the frequency on which the regularly refracted components of the high and low angle rays join. It is suggested that the latter frequency be called the « junction frequency » and that it be denoted by JF.

2. — Equipment

2.1. — *Catalogue.*

A catalogue of oblique sounder transmitters including descriptive information concerning equipment characteristics and operating

schedules is being prepared and will be made available at a later date. Organizations wishing to make use of such transmissions (eavesdropping) are requested to contact directly the institutions concerned.

2.2. — *Frequency sweep.*

In order to facilitate overlay scaling the use of a logarithmic frequency is desirable.

2.3. — *Sweep duration.*

A fast sweep has the advantage of quick response to ionospheric changes and relatively low interference to other services. On the other hand a slow sweep has the very considerable advantage of an improvement in signal-to-noise ratio. A compromise of 5 min for the sweep duration is recommended.

2.4. — *Frequency range.*

A frequency range of 3 to 30 Mc/s will provide useful information for communication purposes. Extension, particularly on the high frequency side, is desirable in order to follow variations of the MOF and to determine the ability of the ionosphere to support propagation. Extension of the frequency range below 3 Mc/s is desirable also for scientific purposes.

2.5. — *Antenna systems.*

Log periodic antennas have the advantage of a wider bandwidth and a polardiagram less dependent on frequency compared for instance with rhombic antennas.

3. — Ray Tracing

In the interpretation of oblique ionograms it is necessary to relay on some form of ray tracing.

A partial list of ray tracing methods is given in Appendix I including certain of the assumptions made and the relative advantages of the different methods. The list of references given is intended to illustrate the various methods, and is in no way exhaustive.

An intercomparison between certain of these methods is proposed.

4. — Scientific uses

Oblique soundings are valuable in revealing the importance of certain phenomena (e.g. equatorial scatter, ionospheric gradients)

not emphasised in vertical soundinbgs. This is due, to a large extent, to the fact that in oblique soundings a much greater volume is sampled than is the case with vertical soundings. In absorption measurements oblique sounding may be helpful since the influence of deviative absorption is much less at oblique incidence than with vertical propagation. With regard to propagation studies, oblique soundings are essential (in the foreseeable future) for the determination of propagation characteristics without which a scientific interpretation of oblique propagation is impossible.

Some problems which need further study are :

1) Absorption and attenuation

2) Structure of the ionosphere :

   a) Structure of Es,

   b) Field aligned ionisation,

   c) Gradients.

3) Propagation characteristics :

   a) Reciprocity,

   b) Statistics of fading,

   c) Path structure,

   d) Polarisation,

   e) Selective fading.

5. — Application to Communication Systems

5.1. — *Introduction.*

As the result of technical advances in recent years, the use of oblique sounders in communication systems has become feasible. The use of these sounders should improve the reliability of the circuits involved which may at present be very low (80 per cent say). A considerable fraction of the outage (20 %) may be saved by the *proper* use of sounders.

5.2. — *Reference concept.*

Because of the differences between a sounder and a communication system it is necessary to define a reference sounder and a reference communication system. Reals sounders and systems can be defined in terms of these references. Details of possible references are given in Appendix II.

For maximum efficiency and minimum interference the use of a single transmitter serving several satellite receivers may be desirable.

5.3. — *Data required from Ionogram.*

The data that the communicator needs from an ionogram are listed below in order of importance.

a) MOF ;

b) LOF ;

c) Variation of multipath time delay with frequency ;

d) Variation of amplitude with frequency ;

e) Estimate of elevation angles of arrival.

The MOF is probably the most important since it is likely that the greatest benefit which will accrue from the sounder will be to reveal the possibility of using frequencies considerably higher than those predicted, especially at the most difficult times such as late night and early morning.

5.4. — *Proposed experiments.*

It is felt strongly that there is a great need for more controlled experiments in which a sounder system is run in conjunction with a communication system. One such experiment has been noted and it is desirable that it should be repeated in many other circumstances.

Reference : Elmendorf - McChellan, Communication Sounder Program, Granger Associates, Febr. 1963.

List of Participants

V. Agy, Boulder ;
Dr. E. Chvojkova, Prague ;
Dr. K. Davies, Boulder (Program Chairman) ;
Dr. W. Dieminger, Lindau ;
J. C. Dito, Leidschendam ;
Dr. R. Egan, Palo Alto ;
K. Folkestad, Kjeller ;
R. G. Maliphant, Cheltenham ;
Dr. H. G. Moller, Lindau ;

P.A.C. Morris, London ;
Dr. P. Newman, Bedford ;
D. L. Nielson, Menlo Park ;
Dr. J. Oksman, Sodankya ;
L. A. Roben, Stanford ;
G. Rose, Lindau ;
W. Utlaut, Boulder ;
Dr. E. Warren, Ottawa ;
A. F. Wilkins, Slough ;
Dr. H. P. Williams, Den Haag.

APPENDIX I

Ray tracing techniques

Class	Assumptions	Advantages
1. Equivalence Method		
1.1	Plane earth ; plane ionosphere No magnetic field	Extreme simplicity enabling one to obtain an order of magnitude calculation of time delay and distance even when no ionogram is available and useful on short paths.
1.2	Plane earth ; Plane ionosphere	Allows determination of the effects of the earth's magnetic field.
2. Overlay Methods		
2.1	Concentric layers with no magnetic field. Empirically corrected, however, angle curves are based on Martyn's equivalence theorem.	Enables use of a slider in calculating apparent ray paths. Use of sliders in scaling the M 3000 factor from vertical incidence ionograms is important since these data are used by C.R.P.L. in their prediction techniques.
2.2	Concentric layers	Corrects for magnetic field in generating a slider for any given ionospheric profile. Particularly useful in analyzing long distance propagation paths with low angles of elevation.
2.3 Inverse Slider	Same as that of slider used.	This is an inverse slider techniques enabling the modes to be identified quickly on an oblique incidence ionogram and the vertical incidence ionogram, at the path midpoint, to be determined.

Class	Assumptions	Advantages
3. Concentric ionosphere		
3.1	Parabolic layers no magnetic field.	Reference to the published ionograms provides a simple method of ray tracing in a parabolic layer.
3.2	Synthesis of ionospheric profiles with line segments.	Profile may be accurately represented.
3.3	Approximately constant magnetic field; can use any profile as in 3.2 above.	A general expression is developed enabling direct calculation of the ray path length using a simple ray treatment.
3.4	Parabolic layers; no magnetic field; constant ratio for Ym/ho other layers, fixed $foF1 = 1.4\ foE$; $foE = 0$ for $\chi \geqq 70°$. Otherwise $foE = g(\cos^u \chi)$.	By assuming concentric ionosphere for each hop but calculating each layer as it is first encountered, one is able to include the first order effects of a horizontal gradient in electron density. Homing-in on the receiver is provided. This allows rapid calculation to be made to identify modes of propagation and to predict MUF's and ray paths from the C.R.P.L. predictions.
4. Skewed ionosphere	Same as in 3.4 above.	Inclusion of tilts by correction of Φ_o at entry into and exit from the layers may give a refinement to the method described above in 3.4.
5. Isoionic contours		
5.1	Hazelgrove Equations	The ray path can be approached more realistically thus providing more accurate ray paths in the regions of extreme tilts or gradients along the great circle.

6. Three dimensional		
6.1	Uses tilting mirror reflector in the ionosphere. Martyn's equivalence theorem.	Gives a first order approximation to supermodes and off great circle path propagation. Nomograms are available for some heights and distances. Others can be calculated and plotted by use of a 7090 computer.
6.2	Hazelgrove Equations.	Most thorough analysis when ionosphere can be specified in great detail. Has homing-in feature incorporated.

REFERENCES

The following partial list of references is intended to be representative of the above methods.

Questions regarding the availability of these programs, for use on a computer, should be directed to the authors given. When no comment is supplied the use of existing graphs or sliders is implied.

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2.2 MALIPHANT, R. G. and MULDREW, D. B. — Accurate transmission curves for vertical incidence ionograms and the production of a general transmission slider, to be published in *Proc. I.E.E.*

2.3 MÖLLER, H. G. — Experiments with pulse transmissions with oblique incidence and variable frequency over 1000 km and 2000 km. Forschungsbericht des Landes Nordrhein-Westfalen Nr. 1149, Westdeutscher Verlag GmbH, Köln and Opladen, 1963.

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3.2 DE VOOGT, A. H. — The calculation of the path of a radio ray in a given ionosphere. *Proc. I.R.E.*, **41**, 1183-1186 (1953).
MULDREW, D. B. — An ionospheric Ray-Tracing Technique and its application to a Problem in long distance Radio Propagation. *I.R.E. Trans.* A et P ; *AP-7*, No. 4 (1959).
MALIPHANT, R. G. — To be published (*I.E.E.E. Trans.* A-P).

3.3 CHVOJKOVA, E. — The refraction of radio waves by a spherical ionized layer. *J.A.T.P.*, Vol. 16, 124-135 (1959).

3.4 KIFT, F. — The Propagation of High-Frequency Radio Waves to Long Distances. *Proc. of I.E.E.*, **107**, Part B, No. 32 (1960).

3.5 FOOKS, G. F. — H. F. Propagation Program, Department of Scientific and Industrial Research, Radio Research Station, I. M. 32, 28 June 1962.

4.1 THOMAS, J. A. and MCINNES, B. A. — Transequatorial Propagation Analysis : Ray Tracing and Mode Analysis, Radio Research Section, University of Queensland, Brisbane, Australia, Scientific Report No. 10 March 1962. Contract No. AF 64 (500)-9.

5.1 DAVIES, K. and FINNEY, J. W. — A method for ray tracing in the ionosphere with oblique incidence, National Bureau of Standards, Report 7275 A, June 1962.

6.1 FENWICK, R. B. — Round-the-World High-Frequency Propagation, Technical Report No. 71. Radioscience Laboratory, Stanford, Cal., Contract No. 225(64), April 1963.

6.2 GROSSI, M. D. — Study of HF Frequencies for Exo- and Endo-Ionospheric Communications, Raytheon Company, Bedford, Mass., October 1962, Report No. ASD-TDR-62-768.

APPENDIX II

Reference Sounder and Communication System

The power signal-to-noise ratio $\frac{S}{N} = \frac{P_{av}}{NF_R} \cdot \frac{1}{B\tau}$

where N = noise power per unit bandwidth ;

F_R = rate of occurrence of elementary symbol ;

B = noise bandwidth ;

τ = pulse width.

Inserting typical values for a sounder and a communication system the following is obtained :

(*a*) *Sounder* :

Peak power = 15 kW ;

F_R = 20 cps ;

τ = 1.0 ms

P_{AV} = 300 watts

B = 3 kc/s ;

so SNR $= \frac{300}{N_s(20)\,(3.10^3)\,(10^{-3})} = \frac{5}{N_s} \simeq 7$ db.

where N_s is the noise power per unit bandwidth of the sounder.

(*b*) *Communications system* :

P_{AV} = 10 kW in 12 frequency shift keying 50 band telegraph channels.
= 835 watts per channel (assuming that the channel power is derived on a basis of power addition)

F_R = 50 baud ;

τ = 20 ms ;

B = 170 c/s ;

so SNR $= \frac{835}{N_c(50)\,(170)\,(20.10^{-3})} = \frac{4.9}{N_c} \simeq 7$ db

where N_c is the noise power per unit bandwidth of the communications system. At this point for the example cited, the sounder and communications circuit provide roughly equal average power signal-to-noise ratios.

Several additional points should be considered before any conclusions are drawn :

(*a*) Sounder detection is dependent on peak signal power to mean noise power ratio and only indirectly on average power signal to noise ratio.

(*b*) The required operating signal-to-noise ratios for each system must be considered separately.

(*c*) The sounder can transmit more than one pulse per frequency thus permitting signal integration.

(*d*) The mean background interference over the swept band of the sounder (N_s) may be, and probably will be, greater than the interference on the allocated frequencies used by the communications system. No allowance is made for this in the following.

Taking (*a*) and (*b*) into account we have the required signal-to-noise ratios as follows :

Sounder : 5 dbs average signal to mean noise power assuming an empirical required peak signal to mean noise ratio of 8 db.

Communications : 15 dbs is assumed for a character error rate of 1 in 10^4 for reception of 5-unit telegraphy.

As regards (*c*) no integration is possible for the communications circuit but assuming that the sounder emits 10 pulses per frequency and that the integration efficiency is 50 % an improvement of 5 db is obtained.

The comparison now emerges in this way :

Sounder :

Signal/noise ratio	$\simeq$ 7 db
Operator observation efficiency	= —2 db
Integration gain	= 5
Total available signal/noise	= 10
Required signal/noise	= 5
Net signal/noise	= 5 db

Communication :

Signal/noise ratio	= $\simeq$7 db
Operator loss	= 0
Integration gain	= 0
Total available signal/noise	= 7
Required signal/noise	= 15
Net signal/noise	= —8 db

The conclusion is therefore drawn that the sounder shows an overall benefit of 5 + 8 = 13 db.

10th June 1963.

CIRCULAR LETTER NO. 1 TO I.Q.S.Y. OBSERVERS OF IONOSPHERIC ABSORPTION BY METHODS A1 AND A3

Dear Colleagues,

May I first introduce myself as U.R.S.I.-C.I.G. subreporter on ionospheric absorption A1/A3 replacing Mr. R. V. Piggott who has taken over the more important and laborious new tasks of a subreporter on vertical ionospheric soundings. I am aware that it might be a difficult task for myself to replace Roy Piggott in view of his outstanding experience on the subject.

The absorption measurements during the I.G.Y. except from a few new scientific results have given a rather broad background of absorption data for certain zones of the world. The main data of this sort shall be summarized soonly in a late Volume of the « Annals of the I.G.Y. ». It results from these data that our I.G.Y. effort has not been large enough in two respects, namely :

— the coverage was not world-wide but limited to certain zones, it was unsatisfactory in the Americas and at low and Southern latitudes in particular,

— the limitation to two frequencies (imposed by practical reasons at the time I.G.Y.) proved to be rather serious at the interpretation of data.

I feel that we should first arrange to have a clear statement of the situation in I.Q.S.Y. — that is why you find a questionnaire annexed to this letter.

On the other side I should inform you that an addendum to the description of methods originally given in *Annals of the I.G.Y.*, Vol: III part II has been edited in I.Q.S.Y. InstructionManual No. 4, Part II. It is acknowledged that this addendum is not quite homogeneous as it had to be written in a hurry using « prefabricated » pieces. If a discussion on the subject of methods should arise another addendum could be published laterly in the *I.Q.S.Y. Notes*. For the time being the two publications cited above are our terms of reference.

With kindest regards, yours sincerely.

Prof. K. Rawer
Ionasphären-Institut
7814 Breisach/Rh. Germany.

BROADCAST OF I.Q.S.Y. GEOPHYSICAL ALERT SYMBOLS ON WWV AND WWVH

During the International Geophysical Year 1957-1958 and the International Geophysical Cooperation 1959 there was an internationally organized system for declaring Alerts and Special World Intervals in order to assist geophysical organizations throughout the world to coordinate their observations of unusual geophysical phenomena. These declarations were broadcast on several of the standard frequency broadcasting stations (WWV, LOL, etc.), as well as distributed by many other methods.

Through 1960 to 1964 there was a continuing program under the international auspices of the International Committee of Geophysics. With the planned expanded cooperation for the International Years of the Quiet Sun, 1964-1965, the scheme of geophysical alerts has been modified. A modified I.Q.S.Y. GEOALERT warning message broadcast plan is *effective beginning on April* 1, 1964, as described in the paragraphs which follow.

Outline of the Plan for Alerts

Declarations of worldwide Alerts (GEOALERTS) will be made by the World Warning Agency (AGIWARN [1]) at 0400 UT (Universal Time, same as GCT) and only at that time. A Warning Message [2]) will be issued at 0400 UT every day. The broadcasts of the « state of warning » symbol on WWV and WWVH refer to these worldwide Alerts as declared by the World Warning Agency.

The plan includes the possibility for Advance Alerts to be distributed locally in a region of the world. *Advance Alerts are not broadcast on WWV and WWVH.* These Advance Alerts are issued at any time of day as soon as possible after the beginning of a geophysical event meeting the stated criteria or after the

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[1]) Operated by C.R.P.L. Radio Warning Services at North Atlantic Radio Warning Service, Box 178, Ft. Belvoir 22060, Virginia, U. S. A.

[2]) Full description and criteria are given in I.Q.S.Y. Instruction Manual (No. 1), World Days, obtainable from any Regional Warning Center or from I.Q.S.Y. Secretariat, 6 Cornwall Terrace, London N.W.1, England.

occurrence of a major solar activity event. In general the distribution of such Advance Alerts will be only within the region, e. g. the Western Hemisphere, and usually by direct telegram to interested scientists. The development of the programs and arrangements for Advance Alerts is the responsibility of the individual Regional Warning Centers. For the Western Hemisphere, the center is the C.R.P.L. North Atlantic Radio Warning Service, Box 178, Ft. Belvoir, Virginia 22060, U. S. A.

Definition of the worldwide Alerts (GEOALERTS).

There are six types of worldwide Alerts : magnetic storm alerts, magnetic calm alerts, solar activity alerts, solar calm alerts, cosmic event alerts and stratospheric warming alerts.

Magnetic Storm Alert (MAGSTORM) is issued when a significant geomagnetic storm with Kp index of 5 or greater is either (*a*) expected, (*b*) has just started, or (*c*) is in progress. If appropriate, the degree of geophysical interest of the storm may be indicated by supplementary words (*d*) aurora observed, (*e*) aurora probable (if K-index reached 7) or (*f*) cosmic ray Forbush decrease (COSRAY DECREASE) of $\geq$2 % as indicated by a neutron monitor.

Magnetic Calm Alert (MAGCALME) is issued when geomagnetic activity is unusually low and no significant disturbance is expected within the next 24 hours.

Solar Activity Alert (SOLACTIVITY) is issued when the general level of solar activity is relatively high because of the presence of one or more active centers on the solar disk.

Solar Calm Alert (SOLCALME) is issued when the sun is extremely quiet. Geophysical stations will be alerted that there is a relative minimum of solar activity. Solar observatories should attempt to witness the birth of a new active region on the sun.

Cosmic Event Alert (COSMIC EVENT) is issued when there is evidence of the first or continued arrival of energetic solar particles at the earth. The degree of geophysical interest of the event is indicated by the supplementary information (*a*) cosmic-ray increase (COSRAY INCREASE) or (*b*) polar cap ionospheric absorption event (POLCAP ABSORPTION).

Stratospheric Warming Alert (STRATWARM) is issued when a sudden and unusual increase in temperature at 30 km or above has been detected. The general geographical region where the warming phenomena have been observed is specified; such events however, usually involve the high level circulation of the entire hemisphere at high latitudes after a period of several days, and an estimate of the area to be affected is given.

Broadcast of the « State of Warning » Symbols on WWV and WWVH.

The information contained in the daily GEOALERT message is indicated in repeated broadcast of a symbol from WWV and WWVH and some other standard frequency broadcast stations. A symbol in Morse Code indicates the « State of Warning » at the time of broadcast. The symbol is given in standard Morse code. For scientists not familiar with radiotelegraphy the time it takes to transmit the symbol can be used as an aid to recognize the symbol.

It is necessary to allow time for the Warning Message to reach the broadcast station. Thus the « First Broadcast » to take into account a Warning Message will be made at some designated time after the 0400 UT time of issue by the World Warning Agency. The time of « First Broadcast » are given for each broadcast station in section (2), below.

(1) *Code Symbols.* — The following are the symbols broadcast in Morse Code used to indicate the State of Warning. The identification symbols « GEO » stand for GEOphysical warning. Please note the symbol identifying the GEOALERT is repeated five times to assure proper identification.

(a)	G	E	O	M	M	M	M	M
	- - ·	·	- - -	- -	- -	- -	- -	- -

(symbol time 8 sec., total time 14 sec.).

This broadcast indicates a MAGSTORM GEOALERT was issued at 0400 UT by the World Warning Agency.

(*b*)	G	E	O	N	N	N	N	N
	- - ·	·	- - -	- ·	- ·	- ·	- ·	- ·

(symbol time 6 sec., total time 12 sec.).

This broadcast indicates a MAGGALME GEOALERT was issued at 0400 UT by the World Warning Agency.

(*c*) G E O S S S S S

--· · --- ··· ··· ··· ··· ···

(symbol time 6 sec., total time 12 sec.).

This broadcast indicates a SOLACTIVITY GEOALERT was issued at 0400 UT by the World Warning Agency.

(*d*) G E O Q Q Q Q Q

--· · --- --·- --·- --·- --·- --·-

(symbol time 13 sec., total time 19 sec.).

This broadcast indicates a SOLCALME GEOALERT was issued at 0400 UT by the World Warning Agency.

(*e*) G E O C C C C C

--· · --- -·-· -·-· -·-· -·-· -·-·

(symbol time 11-1/2 sec., total time 17-1/2 sec.).

This broadcast indicates a COSMIC EVENT GEOALERT was issued at 0400 UT by the World Warning Agency.

(*f*) G E O W W W W W

--· · --- ·-- ·-- ·-- ·-- ·--

(symbol time 10 sec., total time 16 sec.).

This broadcast indicates a STRATWARM GEOALERT was

(*g*) G E O E E E E E

--· · --- · · · · ·

(symbol time 3 sec., total time 9 sec.).

This broadcast indicates that there is no geophysical alert in progress.

The symbols broadcast as a consequence of each variety of Warning Message are given below (the introductory parts of text and symbol have been omitted in this table) :

Warning Message Text	State of Warning Symbol
a) MAGSTORM (time) (descriptive words)	MMMMM
MAGSTORM EXPECTED	MMMMM
MAGSTORM EXISTS	MMMMM
b) MAGCALME EXISTS	NNNNN
c) SOLACTIVITY EXISTS (descriptive words)	SSSSS
d) SOLCALME EXISTS	QQQQQ
e) COSMIC EVENT (time) (descriptive words)	CCCCC
f) STRATWARM EXISTS	WWWWW
g) NIL	EEEEE

(2) *Schedules of State of Warning Broadcasts.* — The symbols (see (1) above) are given in Morse Code a few seconds after the UT times indicated below :

Station	Location	« First Broadcast »	Repeated Broadcasts	Remarks
WWV*	Washington	0418	at 18 min. after each hour	previous symbol broadcast at 0448 UT
WWVH**	Hawaii	0548	at 48 min. after each hour	

* WWV frequencies : 2.5, 5, 10, 15, 20, 25 Mc/s.
** WWVH frequencies : 5, 10, 15 Mc/s.

(3) *Priority order.* — Since it is possible that two types of GEOALERTS could be in effect at the same time, the symbols will be broadcast in the following priority order : C, M, W, S, Q, N, or E.

March 11, 1964

CRPL Radio Warning Service
National Bureau of Standards
Boulder, Col., U.S.A.

I.Q.S.Y. Notes

We quote the following from *I.Q.S.Y. Notes* N°. 6, March 1964.

REGIONAL I.Q.S.Y. MEETING; BUENOS AIRES, AUGUST 1964

Arrangements are being made for a Regional I.Q.S.Y. Meeting and Symposium which will take place in Buenos Aires from 3rd-8th August 1964. The Symposium will include some review papers by invited speakers, progress reports and short papers. The main emphasis will probably be on cosmic radiation, the ionosphere, geomagnetism and solar-terrestrial relations, but other I.Q.S.Y. disciplines will not be excluded. Plans are also being made for discussions on Regional I.Q.S.Y. programmes and on the coordination of geophysical research after the I.Q.S.Y.

The Meeting is being organized on behalf of the Consejo Latino Americano de Radiación y Física del Espacio by Dr. J. G. Roederer, who is a member of the Consejo and also the Regional Representative for Latin America on the Special Committee for the I.Q.S.Y.

The Meeting will be open to delegates from all countries and anyone who is interested in the I.Q.S.Y. or in solar-terrestrial relations and who may wish to attend is invited to write to Dr. Roederer, whose address is : Facultad de Ciencias Exactas y Naturales, Peru 272, Buenos Aires, Argentina.

I.Q.S.Y. INSTRUCTION MANUALS

The I.Q.S.Y. Instruction Manuals listed below have recently become available and copies have been sent to all participating committees and to individuals associated with the disciplines concerned.

December 1963.

Manual No. 2 (Supplement) — Solar Activity. This deals with the reporting of sudden ionospheric disturbances.

December 1963.

Manual No. 5. — Airglow. The subjects covered are photometric observations of airglow, and methods of calibration of airglow photometers.

February 1964.

Manual No. 7. — Cosmic Rays. This contains specifications for the NM-64 Neutron Monitor and the MT-64 Cubical Meson Telescope designed at Atomic Energy of Canada Ltd.

NATIONAL WARNING CONTACTS

The following names and addresses of National Warning Contacts should be added to the lists which have already appeared in *I.Q.S.Y.Notes*, No. 4 and 5. Please note that the National Warning Contact for South Africa, given below, is the correct one and *not* the one which appeared in *I.Q.S.Y. Notes* ,No. 5.

South Africa : Mr. G. H. Oosthuizen, Science Cooperation Division, C.S.I.R., PO Box 395, Pretoria.
Cables : NAVORS.
Telephone : 74-6011.

Vietnam, Democratic Republic of : Nguyen-Xien, Météorologiste, Service Météorologique, Hanoi.

United Arab Republic : Dr. M. F. Taha, Meteorological Dept., Ministry of War, Koudry El-Quobba, Cairo.
Cables : WEATHER CAIRO.

Czechoslovakia : P. TŘÍSKA, Geophysical Institute of the Czechoslovak Academy of Sciences, Praha 4, Spořilov.
Cables : MEGER PRAHA,
Telex : 00346-ION PRUHONICE.
Telephone : 92 37 96, 99 22 04, 99 05 25.

NATIONAL PROGRAMMES

(Abstracts)

Pakistan

PROVISIONAL PROGRAMME FOR THE I.Q.S.Y. (November 1963)

INTRODUCTION.

The programme for the I.Q.S.Y. has been drawn up by Pakistan Meteorological Service in association with the Pakistan Space and Upper Atmosphere Research Committee (SUPARCO). The summary of the programme is given in the following paragraphs.

1. — WORLD DAYS

The warning messages are monitored at the four National Communication Centres viz. Karachi, Lahore, Dacca and Chittagong and disseminated in the country through Meteorological T. P. circuits, land-line telegrams and W. T. Messages to all I.Q.S.Y. participant stations.

These warnings are also included in the *News Bulletin of Radio Pakistan* and published in national newspapers for the benefit of amateur observers and others interested in the I.Q.S.Y.

V. — IONOSPHERE.

The observations will be taken at Quetta.

Ionograms of vertical incidence soundings will be obtained every 15 minutes by means of automatic multifrequency ionosonde. On regular World Days and Special World Intervals continuous records will be obtained.

Continuous intensity records will be maintained of the signals transmitted from the beacon transmitter in Japan (when set up).

Sounding Schedules.

The basic schedule adopted internationally requires soundings at 00, 15, 30 and 45 min. past each hour. Deviation from this should be kept to an unavoidable minimum.

On Regular World Days and Special World Intervals, soundings every 5 min. are recommended. The rate of observation schedules should be made faster and preferably continuously in case of any unusual phenomena taking place.

Equipment : Union Radio Mark II recorder (U. K.)

A pulse transmitter consisting of a master oscillator and power amplifier is tuned through the frequency range in five bands. The receiver output is presented on two cathode-ray tubes, one for monitoring and one for photographic recording, each displaying a linear frequency sweep. Height and frequency calibrations, which are derived from a crystal source, are displayed and a crystal-controlled time switch is incorporated for automatic operation.

Peak Power	1 kW.
Frequency Sweep	0.75 to 24 Mc/s
Sweep Duration	5 min.
Pulse-repetition frequency	50 per sec.

Characteristics to be deduced from the Ionograms :
*fo*F2, *fo*F, *fo*Es, *fo*E, *f* min.
*h'*F2, *h'*F1, *h'*Es, *h'*E,
M(3000)F2, M(3000)F1, *fbEs.*

Programme of Absorption Measurements :
1. (Pulse reflection method).
2. (Simple receiver system).

Address : The Director, Meteorological Service, Frere Road Karachi, Pakistan.

Cuba

Ionosphere : Vertical soundings of the ionosphere by the pulse method at one station.

France

Rapport d'activité 1963

Le présent rapport rend compte de l'état d'avancement des études entreprises sous le patronage du Comité Français pour les A.I.S.C. à la date du 1er novembre 1963.

Les études concernées sont traitées dans l'ordre de leur nomenclature dans la brochure « Programme de la Participation Française », éditée en mars 1963 par le Comité. Ce programme a été reproduit dans le bulletin d'information *I. Q.S.Y. Notes*, No. 2 (mai 1963). Les études qui figurent dans cette brochure, sans être entreprises sous le patronage du Comité (1), ne sont que mentionnées avec la référence de l'organisme responsable. Pour les études patronnées par le Comité, on a indiqué l'état d'avancement au 1er novembre 1963 et les perspectives pour l'année 1964. Le cas échéant, les modifications du programme initial sont précisées.

I. — JOURS MONDIAUX.

Service des Ursigrammes et Jours Mondiaux (A.I.S.C.).

Le service de Bagneux est équipé pour faire face aux obligations des A.I.S.C.

IONOSPHERE.

1. — *Sondages à incidence vertical.*

(*a*) Stations du groupe de recherches ionosphériques (A.I.S.C. et C.N.E.S.).

Les stations de Garchy, Tamanrasset (2), Port-aux-Français et Dumont d'Urville fonctionnent régulièrement. Celle de Bangui sera en fonctionnement avant la fin de 1963.

De nouveaux sondeurs verticaux (types suédois et australien) équiperont en 1964 les stations de Port-aux-Français, Dumont d'Urville et Garchy.

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(1) On a adopté les indications suivantes : C.N.E.S. pour les études patronnées par le Centre National des Etudes Spatiales, Labo pour les études financées par d'autres ressources du laboratoire concerné.

(2) La station de Tamanrasset est sous la haute responsabilité des autorités de la République Algérienne.

(*b*) Stations de la Division des Prévisions Ionosphériques (A.I.S.C. et Labo).

Les stations de Saclay, Dakar, Djibouti, Tananarive, Tahiti fonctionnent régulièrement. Un nouveau sondeur D.P.I. doit être prêt en janvier 1964 ; de nouvelles antennes doivent équiper la station de Djibouti à la fin de 1963, celle de Tahiti en 1964.

(*c*) Station de Poitiers (A.I.S.C. et Labo).

La station sera installée sur le nouveau terrain de Poitiers en 1964.

2. — *Absorption ionosphérique.*

(*a*) Sondeur d'absorption (A.I.S.C.).

Des sondeurs d'absorption à 4 fréquences seront installés en 1964 à Garchy, Port-aux-Français et Bangui.

b) 1. Riomètres (A.I.S.C.). Des riomètres à 4 fréquences (6,5 ; 10,1 ; 15,5 ; 25 MHz) seront installés à Port-aux-Français en janvier 1964 et à Dumont d'Urville dans le courant de 1964.

2. Riomètres (A.I.S.C.). L'installation des riomètres dans les stations est retardée.

c) Mesures de champ d'émetteurs (A.I.S.C. et Labo).

Des équipements pour mesure de champ seront en place à Fort de France, Nouméa et Saclay pour le début 1964, des émetteurs étant installés à Dakar et Tahiti.

3. — *Vents ionosphériques.*

a) Etude des vents ionosphériques au niveau de la couche E (Labo).

b) Etude des perturbations itinérantes par diffusion arrière (C.N.E.S. et Labo).

(*c*) Etude des traînées météoriques (A.I.S.C. et C.N.E.S.).

Les observations sont en cours de façon permanente en diffusion avant (La Grau) et commenceront au début 1964 en diffusion arrière (Garchy). (L'émetteur de La Haye fonctionne à 39 MHz).

4. — *Phénomènes à très basse fréquence.*

a) Enregistrement permanent des sifflements naturels (A.I.S.C. et Labo).

Les enregistrements seront transférés à la nouvelle station de Poitiers au début de 1964.

b) Etude de la structure électromagnétique des sifflements (A.I.S.C. et Labo).

Des mesures sur base longue triangulaire (100 km) ont eu lieu au début de 1963 dans la région d'Orléans, et durant l'été 1963 simultanément à Orléans et Garchy. Des mesures sur base courte (1000 m) ont été essayées à la fin de 1963.

Les mesures simultanées sur base longue seront reprises en 1964 et deux bases courtes seront installées en 1964.

De premiers résultats ont été publiés : J. Delloue *et al*, *C. R. Acad. Sc.*, **257**, 1131 (1963) et 257, 1327 (1963).

c) Enregistrement d'émissions radioélectriques à très basse fréquence (A.I.S.C.).

Un récepteur de phase pouvant recevoir les émissions de N.B.A. ou G.B.R. sera installé à Port-aux-Français en janvier 1964. L'enregistrement continu se poursuit à Bagneux.

Un récepteur simultané de 3 émissions sera réalisé en 1964.

d) Enregistrement des phénomènes à extrêmement basse fréquence (C.N.E.S. et A.I.S.C.).

Sous la responsabilité de R. Gendrin, les observations régulières par spectromètre se poursuivent à Chambon-la-Forêt. Un spectromètre sera installé en janvier 1964 à Port-aux-Français et, pour une période limitée de 1964, un autre spectromètre fonctionnera dans la zône conjuguée magnétique de Port-aux-Français en Europe du Nord.

5. — *Bruits atmosphériques.*

a) Enregistrement du niveau moyen des atmosphériques (A.I.S.C.).

Les enregistrements se poursuivent aux stations de Meudon, Bangui, Tananarive, Tahiti, Port-aux-Français. Un matériel complémentaire sera installé en 1964 à Bangui, Tahiti et Meudon.

b) Enregistrement du bruit atmosphérique sur 27 kHz (A.I.S.C. et Labo).

Les observations se poursuivent à Saclay et restent prévues à Tananarive et Tahiti.

6. — *Observation des effets ionosphériques d'une éclipse de soleil (A I S C et Labo).*

L'étude reste prévue pour 1965

7. — *Expériences entre points conjugués.*

a) Expériences entre la France et l'Afrique du Sud (A.I.S.C.).

Le programme initialement prévu est réduit à 3 expériences :

1. Perturbations magnétiques, sous la responsabilité de R. Schlich (cf. III. 4).
2. Guidage géomagnétique en hautes fréquences, sous la responsabilité de F. du Castel.

   La réception d'un émetteur de la Turbie (8 à 12 MHz) sera entreprise à Grahamstown dans le courant de 1964.
3. Guidage géomagnétique en très basses fréquences, sous la responsabilité de J. Delloue.

   La réception de l'émetteur de Saint-Assisse (FUB 16 kHz) sera entreprise à Grahamstown dans le courant de 1964. Elle sera poursuivie en 1965 avec le nouvel emetteur FUB.

b) Expériences entre les Iles Kerguelen et l'Europe du Nord (C.N.E.S. et A.I S.C.) (cf. V. 4.(*d*)).

8. — *Etude de l'ionosphère par diffusion électronique incohérente (C.N.E.S.).*

9. — *Mesure de la densité ionosphérique (C.N.E.S.).*

10. — *Etude par satellite des irrégularités d'ionisation exosphérique (C.N.E.S.).*

11. — (*nouveau programme*) *Etude de l'anomalie ionosphérique équatoriale (A.I.S.C. et Labo).*

Objectif : Etude de la structure et de l'évolution de l'anomalie ionosphérique équatoriale en Afrique.

Responsable : F. du Castel.

Nature : Sondages ionosphériques verticaux aéroportés, associés à des stations de sondage au sol, entre Cotonou (Togo) et Niamey (Niger), en période d'équinoxe et de solstice.

Dates : décembre 1964 et mars 1965.

Lieux : Togo et Niger.

Adresse : F. du Castel, C.N.E.T., 3, Avenue de la République, Issy-les-Moulineaux (Seine-et-Oise), France.

Brazil

Proposed I.Q.S.Y. Programmes (December 1963)

2. — Comissão Nacional de Atividades Espaciais (G.O.)
(National Committee for Space Research)

II. — Meteorology IV*b* Airglow, V Ionosphere, VI Solar activity.

The basic construction of the main laboratory Comissao Nacional de Atividades Espaciais in São José dos Campos (SP) is practically finished.

1. The following projects are already in operation :

V. — (*a*) *Ionospheric studies with satellite transmissions* (*R.A.S.A.*).

Differential Doppler recordings of over 500 satellite passages have been acquired. Presently, the data are being analysed and the results are beginning to show very interesting features of the total electron content variations, not only through the equatorial anomaly of F-region critical frequency, but also through the high-energy flux region of the Brazilian anomaly of the magnetic field.

(*b*) *Cosmic noise method of absorption measurements* (*M.I.R.O.*).

Continuous recordings have been made with a 30 Mc/s riometer since March 1963. A quiet-day curve has been computed and studies of the correlations of absorption with solar flares, magnetic activity, etc., are well under way.

VI. — (*c*) *Solar radio emissions* (*R.E.S.O.*).

Solar radio emissions are being monitored with scanning receivers in the frequency range 10-30 Mc/s. A new receiver and antenna are in development stage to extend this range up to 90 Mc/s.

V. — (*d*) *Atmospheric noise recording* (*O.B.R.A.*).

Noise recordings have been made since July 1963 at eight discrete frequencies from 50 kc/s to 20 Mc/s, utilizing an NBS-ARN-2 station.

2. Research projects to be put in operation before the end of the first quarter of 1964 :

V. (*a*) Vertical incidence sounding (S.O.N.D.A.) ;

VI. (*d*) Solar radio interferometer (40 Mc/s) ;

V. (*e*) VLF propagation ;

3. Research projects which, it is hoped, will be put into operation during the I.Q.S.Y. :

V. (*a*) Propagation characteristics with frequency step sounders ;

(*b*) Back-scatter soundings ;

(*d*) D-region studies with small rockets.

Responsible investigator : Dr. Fernando de Mendonça, Comissão Nacional de Atividades Espaciais, (G. O.), São José dos Campos,S. P.

3. — Escola Politecnica de São Paulo

(Centro de Radio Física)

V. — Ionosphère.

1. Sondages verticaux à São Paulo. Le Centro de Radio Física (C.E.R.F.) doit continuer l'opération de la sonde ionosphérique de São Paulo effectuant des sondages journaliers toutes les 1/2 heures, sauf aux Jours Mondiaux Réguliers et Spéciaux où les sondages seront faits tous les 1/4 d'heure.

2. Dépouillement des ionogrammes. Le C.E.R.F. doit assurer l'obtention des données suivantes :

a) Valeurs horaires et médianes de *fo*E, *fo*E*s*, *fo*F1, *fo*F2, *h'*E, *h'*F, *h'*F2, M(3000)F2, M(3000)F et *f*min des stations de São Paulo et Natal ;

(*b*) « *f*-plots » journalières de la station de Natal et pour les Journées Mondiales de la station de São Paulo ;

c) Dépouillement des ionogrammes de la future station de Belem, si cela est demandé par la Commission Nationale des Activités Spatiales.

3. Détermination des profils N(*h*). Les profils N(*h*) seront déterminés les Journées Régulières toutes les heures à São Paulo et à Natal. Le même programme pourra s'appliquer à la station de Belem.

Tous ces résultats seront envoyés à un Centre Mondial des Données.

VI. — Activité Solaire.

Le C.E.R.F. ne peut pas encore assurer l'exécution de son programme solaire. Il n'est pas sûr que l'équipement disponible puisse être installé dans un lieu de faible niveau de bruit.

Le personnel du C.E.R.F. est en train d'installer deux instruments à São José dos Campos :

a) interféromètre, 30 MHz ;

b) récepteur panoramique, 11-22 MHz.

L'interféromètre sera utilisé pour la localisation des centres d'émission solaire à 30 MHz.

Cet équipement sera aussi utilisé pour l'enregistrement du flux total émis par le soleil à 30 MHz et, comme riomètre, pour l'enregistrement du bruit galactique. Il est prévu d'observer l'éclipse de la nébuleuse du Crabe par la couronne solaire, le mois de juin 1964 et juin 1965.

Le récepteur panoramique (11-22 MHz) sera utilisé dans l'enregistrement régulier du spectre du flux émis par le soleil.

Responsable : Prof. L. de Queiroz Orsini, Escola Politecnica, Praça Cel. Fernando Prestes 74, São Paulo, SP.

VI. — Solar Radioastronomy.

A solar radiotelescope in the region of 20 to 30 Mc/s will be operated continuously in collaboration with the C.N.A.E. in Sao José dos Campos. A new receiver and antenna system are being developed there in order to extend the spectral observations to the 10 or 60 Mc/s region. Future plans include the installation of a steerable parabolic antenna of 10 meters diameter to extend the solar observations up to the frequency of 1000 Mc/s.

Responsible investigator : Dr. Georges Schwachheim, Centro Brasileiro de Pesquisas Físicas, Avenida Wenceslau Braz 71, ZC-82, Rio de Janeiro, G. b.

6. — Instituto de Pesquisas da Marinha
(The Navy Research Institute)

V. — Ionosphere.

The following plans will be developed at the Navy Research Institute in Natal :

(*a*) *R.A.S.A. Project.* — The measurement of electron density in the ionosphere by means of reception of satellite signals. The equipment will be installed in Natal. The results will be sent to the C.N.A.E. (National Committee for Space Research), which coordinates the work of the three stations concerned in these studies in Brazil (Natal, Balem and São José dos Campos). This project coordinates with the Stanford University.

(*b*) *S.I.N.O. Project.* — Determination of physical properties of the ionosphere by the use of rockets. A launching site will be built in Natal. Results will be sent to São José dos Campos. This project is to be executed by the C.N.A.E. with the use of facilities made available by the Navy Research Institute at Natal. In this connection, a proposal has been submitted and a decision will soon be taken.

(*c*) *Ionospheric Sounder.* — Operation of one ionospheric sounder located in Natal, received from the National Bureau of Standards. Coordination with similar work done at the University of São Paulo.

(*d*) Investigation of ionospheric radio-propagation phenomena in equatorial latitudes on signals received at Natal and transmitted by a station located in Monrovia, Liberia. This programme is coordinated with the National Bureau of Standards (Boulder, Colorado). Results of measurements will be sent to the N.B.S.

Responsible investigator : Com. Geraldo Silva Maia, Instituto de Pesquisas da Marinha, Rio de Janeiro.

Philippines

V. — IONOSPHERE.

Vertical incidence soundings with a modified U.S.-N.B.S. Model C-3 ionosonde will be carried out. A 600-foot long delta is used in the antenna system to obtain soundings at frequencies from 0.25 Mc/s to 29 Mc/s. Daily *f*-plots and N(h,t) profiles will be made.

The relative ionospheric opacity will be studied in the operation of one, or possibly two, riometers at 30 Mc/s. The second riometer will be operated near the magnetic equator. An indirect solar flare detector of the High Altitude Observatory type will record S.C.N.A. at 18 Mc/s.

Address : R. L. Kintanar, Director, Weather Bureau, P.O. Box 2277, Manila, Republic of the Philippines.

Netherlands

Programme for the I.Q.S.Y. (January 1964)

The following additions should be made to the Programme in *I.Q.S.Y. Notes*, No. 2, pp 64-66.

V. — Ionosphere.

Rockets will be launched in Surinam for the determination of ionospheric winds by the sodium trace method.

Antarctic expedition.

A Belgian-Netherlands expedition sailed on December 8, 1963, from Antwerp to occupy the Antarctic base Roi Baudouin (70°26′S, 23°19′E). The programme is as follows : Meteorology, Aerology, Solar Radiation, Nuclear Radiation, Atmospheric Electricity, Geomagnetism, Aurora, Ionosphere, Geodesy, Glaciology, Gravimetry, Biology and Physiology.

Address : Prof. Dr. J. Veldkamp, K.N.M.I., De Bilt.

COMITÉ INTERNATIONAL DE GÉOPHYSIQUE

Final Catalogue of I.G.Y.-I.G.C. Data

Arrangements have been made by the C.I.G. with the Pergamon Press to issue the final *Catalogue* as part of the *Annals* within a period of approximately three months. Furthermore, although the *Catalogue* is approximately 800 pages in length (most volumes of the *Annals* run about 400 pages), arrangements have been made with the Pergamon Press to issue the *Catalogue* according to the following price schedule.

I. — Complete Volume

(*a*) General price to the public : $ 10.00 per copy.

(*b*) A special price is available to all W.D.C.S. and to I.G.Y. committees and/or their successors for *bulk* orders (25 *copies or more*) : $ 4.00 per copy. (*Orders must be placed directly with Pergamon Press.*)

II. — Reprints of Separate sections

Because the C.I.G. believe that some of the W.D.C.s might wish copies of the discipline sections, the following arrangements were made, effective until 1 April 1964 :

COST OF SEPARATE SECTIONS

Section	Title	No. of pages	Price (U. S. $)	
			Without Special cover	With Special cover
I	General	10	.30	.40
II	Meteorology	112	.50	.60
III	Geomagnetism	38	.30	.40
IV*a*	Aurora	44	.30	.40
IV*b*	Airglow	8	.30	.40
V	Ionosphere	30	.30	.40
VI	Solar Activity	28	.30	.40
VII	Cosmic Rays	16	.30	.40
VIII	Longitudes and Latitudes	8	.30	.40
IX	Glaciology	50	.30	.40
X	Oceanography	230	1.00	1.10
XI	Rockets and Satellites	108	.50	.60
XII	Seismology	18	.30	.40
XIII	Gravimetry	10	.30	.40
XIV	Nuclear Radiation	34	.30	.40

Please note : (1) These prices for separates apply only to orders received by Pergamon before 1 *April* 1964 (so that the separates can be printed while plates are on the press for the regular volume). (2) *Thereafter*, reprints of sections of the *Catalogue* shall be billed to the purchaser at manufacturing cost. Accordingly, purchasers wishing to place orders for section reprints after 1 *April* 1964 should obtain an estimate of cost before placing an order. (3) Finally, as to reprints of the discipline sections : W.D.C.s and I.G.Y. committees and/or their successors can make their own reprints of such sections at any time. *Again please note* : Orders for *separates* under the above price schedule must be placed directly with *Pergamon Press* (Headington Hill Hall, Oxford, England) by no later *than* 1 *April* 1964.

Bibliography

We inform our readers that the C.I.G. has issued, through the the C.I.G.-I.Q.S.Y. Secretariat, the « Guide to international data exchange through the World Data Centers (for the period 1960- onwards) ».

I. U. W. D. S.

Minutes of the 2nd Meeting of the Steering Committee for the International Ursigram and World Days Service

Tokyo, Japan, September 13 and 16, 1963

1. — *Attendance* :

Steering Committee :

Pick (for Michard) — I.A.U.
Ramanathan (for Mitra) — U.R.S.I.
Uyeda — Western Pacific Region.
Likhter (for Zevakina) — Eurasian Region.
Smith-Rose — European Region.
Shapley — Western Hemisphere Region.
Contrez (for De Feiter — I.U.W.D.S. Secretary).
Kasuya (for Lincoln — I.U.W.D.S. Deputy Secretary).
Herbays (part time) — U.R.S.I. Secretary General.
(Nicolet — I.U.G.G. could not be present for formal part of meetings).

Invited Liaison :

Imai — W.M.O. (accompanied by Naito).

Observers :

Takiguchi, Sinno, Hakura.

Mr. A. H. Shapley presided and Prof. R. Coutrez served as acting secretary.

2. — *The agenda was as follows* :

1. Review of Minutes of First Meeting (Brussels, Oct. 1962).
2. Organization for I.Q.S.Y. :
   (*a*) Report by I.Q.S.Y. Reporter for World Days.

(*b*) Report by Secretary including I.U.W.D.S. Code booklet and 10 cm flare warning plan.

(*c*) Comments by Regional Warning Centers and Associate R.W.C.

3. Cooperation with C.O.S.P.A.R. :

(*a*) Spacewarn system.

(*b*) Codes.

(*c*) Working Group 2; Correspondent for World Days and Alerts.

4. Contacts with S.C.A.R. and W.M.O. : comments by liaison representatives.

5. Proposal for new Associate Regional Warning Centers.

6. Publications :

(*a*) Minutes.

(*b*) Calendars.

(*c*) Calendar Records (consideration of proposed abridged format).

(*d*) Annual activity Reports.

(*e*) R.W.C. circulars.

(*f*) Other.

7. Financial situation and plans for 1964, 1965.

8. C.C.I.R. Actions on modulation on frequency broadcasts.

9. I.U.W.D.S. officers (see 4.3 of I.U.W.D.S. Aims and Structure).

10. Any other business.

3. — The minutes of the first meeting, Brussels, October 1962, have been published in *U.R.S.I. Information Bulletin*, No. 136 (Jan.-Febr. 1963). They were confirmed with the following correction and comments :

(*a*) In paragraph 5 a.1(*b*), the reference to cosmic ray physicists should be qualified to read « *geophysical* cosmic ray physicists. »

(*b*) Formal approval of the reconstitution of the I.U.W.D.S. and of the revised aims and structure have been received from Secretary-General I.A.U. (March 1963) and from I.U.G.G.

Executive Committee (March 1963) meeting. It is understood that similar official action will be taken by the U.R.S.I. Executive Board at the (present) U.R.S.I. General Assembly concerning the endorsement of the new arrangements of I.U.W.D.S. by U.R.S.I.

4. — *Organization for I.Q.S.Y.* :

(*a*) The I.Q.S.Y. Reporter for World Days (Mr. Shapley) outlined the steps taken since the last I.U.W.D.S. meeting. A preliminary draft of the World Days programme was developed during the winter of 1962-63 in consultation by correspondence with interested representatives of the I.Q.S.Y. disciplines and the I.U.W.D.S. organization. Most of the final details were worked out at the March 1963 I.Q.S.Y. meeting in Rome. Most details of the programme are given in the I.Q.S.Y. Manual, No. 1, World Days published, July 1963 by the I.Q.S.Y. Secretariat (6 Cornwall Terrace, London NW.1). It is intended to introduce the necessary additional material and details in the publication *I.Q.S.Y. Notes*, issued irregularly by the I.Q.S.Y. Secretariat.

The I.Q.S.Y. programme has 5 main components, developed from the work of recent years done under the auspices of the I.U.W.D.S. :

(i) Calendar.

(ii) Alerts (world wide and regional).

(iii) Retrospective World Intervals.

(iv) Current data Summaries.

(v) Communications arrangements.

The International Geophysical Calendar for I.Q.S.Y. 1964-1965 has also been published separately by I.U.W.D.S. and is being given wide distribution through both the usual channels and through the I.Q.S.Y. Secretariat. Both the U.R.S.I. office and the I.Q.S.Y. office will have a reserve supply. The calendar has been sent for publication to the usual list of scientific journals. It was recommended that the journal « *Geomagnetism and Aeronomy* » (U. S. S. R.) be added to this list.

The I.Q.S.Y. Reporter has issued a mimeograph circular to R.W.C. (September 5) with suggestions for policy and

procedures for the rapid selection of periods of Alerts. After discussion, the regional representatives in I.U.W.D.S. agreed to stress to their R.W.C. the importance of sending regularly to the World Warning Agency telegraphic messages of advice on declarations of worldwide GEOALERTS.

A new kind of Alert introduced for I.Q.S.Y. is for important warmings in the high stratosphere (GEOALERT STRATWARM). The organization and scientific criteria for this are still being worked out in detail by appropriate representatives of the meteorological discipline. The I.U.W.D.S. reacted favourably to a suggestion from an ad hoc group at the Berkeley I.U.G.G. General Assembly that the U. S. Weather Bureau should make decisions on GEOALERT STRATWARM and transmit to the World Warning Agency to initiate the worldwide distribution. Dr. Likhter indicated that U. S. S. R. scientists hoped to be ready to assist in this new activity.

The procedures for selection of Retrospective World Intervals (page 16 of World Days Manual) were reviewed. The I.Q.S.Y. Reporter reported that the C.I.G.-I.Q.S.Y. Committee had recommended that such intervals also be selected for 1960-62 and for 1963. The organization of this work has already started through correspondence and circular letters.

(*b*) A report was presented on behalf of the I.U.W.D.S. Secretary (Mr. De Feiter) on the I.U.W.D.S. Solar-Geophysical Code booklet and on steps he had taken in response to a recommendation of the March 1963 I.Q.S.Y. meeting in Rome.

The meeting recommended that the code booklet be issued as a matter of urgency, even if some practical compromises have to be made in content and format, and that distribution be made free of charge, to bona fide applicants through the R.W.C., the I.Q.S.Y. Secretariat, National Warning Contacts and, in addition, through the Regional Committees for the I.U.W.D.S. to insure at least that each member has a copy.

The meeting indicated general approval to the 10 cm flare warning plan (know as ADALERTPRESTO)-which involves expedited communications to a small list of applicants. It was noted that U. S. S. R. will start such observations some

time after the first of 1964. The 10 cm flare warning plan is to be published in *I. Q. S. Y. Notes*, number 6.

(*c*) There were comments on some details of the plan for I.Q.S.Y. : from R.W.C.-NERA and R.W.C.-MOSCOW on the possibility of making some use in I.U.W.D.S. telegraphic interchange of the prospective new channel for satellite meteorological data ; from R.W.C.-Tokyo on indicators for some particular new stations. These comments were referred to the secretaries for action.

5. — *Cooperation with C.O.S.P.A.R.*

(*a*) The meeting confirmed Mr. Shapley as I.U.W.D.S. spokesman to COSPAR Working Group 3. The SPACEWARN system for interchange and distribution of satellite orbital information was reviewed briefly. There seemed to be no questions of general policy to consider. The meeting urged the regions to continue cooperation in this phase of I.U.W.D.S. work. Some questions of particular detail were discussed by Ramanathan and referred to the Spokesman.

(*b*) The SPACEWARN codes (SATOR, SATAT, SATEV)were published in *C.O.S.P.A.R. Information Bulletin*, No. 9 (July 1962). At the C.O.S.P.A.R. 1963 Warsaw meeting a new working party was established under Mr. Shapley to consider the possible need for still further revisions in the light of experience.

(*c*) The appointment of the I.U.W.D.S. Secretary (Mr. De Feiter) as I.U.W.D.S. representative to C.O.S.P.A.R. Working Group 2 on I.Q.S.Y. programme was confirmed by the meeting.

6. — *Contacts with S.C.A.R. and W.M.O.* :

(*a*) The Chairman of the S.C.A.R. Working group on the Upper Atmosphere F. Jacka, has agreed to serve as informal liaison with I.U.W.D.S., and sent a message of greeting to the meeting. As regards collection and distribution of current informatien from and to Antarctic stations, the most recent general opinion within S.C.A.R. is to continue the present arrangements of dealing through the various national headquarters rather than to organize Antarctica as another region within the I.U.W.D.S. system.

(*b*) Dr. Imai, who was W.M.O. representative to the Tokyo U.R.S.I. General Assembly, attended the meeting and expressed the hope that cooperation between I.U.W.D.S. and W.M.O. continue. The arrangement is that Dr. Gressman (Washington) is liaison as regards the International Geophysical Calendars and Mr. Ashford (W.M.O.-Geneva) on other aspects of the cooperation.

7. — *New Associate Regional Warning Centers.*

(*a*) On the proposal of R.W.C.-Moscow, the I.U.W.D.S. Steering Committee recognized the designation as Associate Regional Warning Centers of the centers at Prague and at Irkutsk.

(*b*) The national center for India at New Delhi has asked to be recognized as an Associate R.W.C. This center already distributes data by radio broadcast. It would not depend on one particular R.W.C. but, like Sydney, would be in touch with R.W.Cs. according to the conveniences of communications and these problems were discussed among Ramanathan (acting for Mitra), Likhter, Uyeda and Coutrez during the course of the meetings. The I.U.W.D.S. Steering Committee formally recognized the center at New Delhi as an Associate R.W.C.

8. — *Publications.*

(*a*) *The minutes* of the first meeting of the Steering Committee were published in *U.R.S.I. Information Bulletin* No. 136, (Jan./Febr. 1963) and in *I.U.G.G. Chronicle*, No. 49 (April, 1963). This same policy will be followed in future.

(*b*) *International Geophysical Calendars* have been published by I.U.W.D.S. (through the Deputy Secretary) and also submitted for re-publication to a list of scientific journals. The Calendar for 1963 was distributed in November 1962 and for 1964-1965 in June 1963. The Calendar for 1966 ought to be published early in 1965.

(*c*) The *Calendar Records* for I.G.Y. and I.G.C.-1959 have appeared as *I.G.Y. Annals* Vol. XVI Parts I and III, respectively. The Calendar Records for 1960-62 are in advanced state of compilation by the Deputy Secretary and could be ready by the end of 1963. The Steering Committee recommended to publish

them as an U.R.S.I. Monograph. As regards the Calendar Records for I.Q.S.Y. and perhaps 1963, it was agreed to prepare the resumes on a more current basis (in response to a request by the C.I.G.-I.Q.S.Y. Committee) with a time delay of only about 4 months after collection of data and to publish in *I.Q.S.Y. Notes*. Somes changes of content from 1960 onwards proposed by the Deputy Secretary were approved as follows : replace auroral indices (which take a long time to assemble) by comments or highlights on outstanding auroras ; omit ionospheric F-region indices ; omit blackout indices unless Dr. Hakura considers that he can take over the responsibility for supplying the necessary data. Members are invited to send further comments or suggestions to the Deputy Secretary (Miss Lincoln)who in any case must take detailed editorial decisions on content and format. There should be a prepared discussion of this I.U.W.D.S. project at the next meeting of the Steering Committee.

(*d*) *Annual summaries of work under I.U.W.D.S. auspices.* — The report for 1962 has been published in *U.R.S.I. Information Bulletin* No. 138, May/June, 1963 and in *I.U.G.G. Chronicle*, No. 50 (July, 1963). The meeting requested that such annual reports be published also in *U.R.S.I. Information Bulletin*. Members were asked to send any comments to the I.U.W.D.S. Secretary.

(*e*) *R.W.C. Circular.* — They are issued from time to time in mimeograph form and concern operating details of I.U.W.D.S. work. R.W.C. and Associate R.W.C. are encouraged to send material for R.W.C. circulars to the I.U.W.D.S. Deputy Secretary.

(*f*) *Other publications.* — It was noted that the *I.Q.S.Y. Manual*, No. 1, World Days, was compiled by I.U.W.D.S. although published by the I.Q.S.Y. organization. Additional copies are available to R.W.C. and any users from the I.Q.S.Y. Secretariat.

9. — *Financial situation and plans for* 1964 *and* 1965.

A provisional financial statement as of June 30 1963 was presented and it was noted that the balance was approximately $ 1800. In the absence of the Secretary it was not possible to make estimates for 1964-1965 and the meeting agreed that it be

left to the officers to prepare a sufficiently detailed budget to be proposed to F.A.G.S. to be drawn along the general lines of past expenditures, except that the meeting considered that financial support ought to be obtained from some source in order to allow travel of *operating* people for coordinating meetings or other interconnections ; the meeting invited the Chairman to investigate this last point.

10. — *C.C.I.R. Action on Modulation on Standard Frequency Broadcasts.*

The actions taken at the 1963 Geneva meetings of C.C.I.R. on this topic were examined and considered to be satisfactory from I.U.W.D.S. point of view. The meeting expressed appreciation of the efforts in this connection by Mr. Decaux, U.R.S.I. liaison to C.C.I.R. and Dr. Uyeda and Miss Lincoln.

11. — *I.U.W.D.S. Officers.*

The meeting reviewed the question of I.U.W.D.S. officers as provided for in the document on I.U.W.D.S. Aims and Structure. On proposal of Coutrez, seconded by Ramanathan, the meeting renewed Mr. A. H. Shapley as Chairman, Mr. L. de Feiter as Secretary, and Miss J. V. Lincoln as Deputy Secretary, and so informed the U.R.S.I. General Secretary.

12. — *Other Business.*

(*a*) The meeting was in general agreement with the proposals concerning STRATWARM GEOALERTS described in a circular communication by W. W. Kellogg. Appropriate further discussion and action is left to the I.Q.S.Y. Reporter for World Days.

(*b*) Communications from Cook of the Associate R.W.C. at Sydney were referred to I.Q.S.Y. Reporter.

(*c*) A report on Activities in the Western Pacific Region was noted with appreciation.

(*d*) It was decided that the next meeting should be at the call of the chairman.

Note : These minutes were prepared by the acting secretary, Prof. Dr. R. Coutrez, and amended by the Chairman, Mr. A. H. Shapley.

I herewith express my gratitude to Prof. Coutrez for his willingness to replace me at the meeting and to write these minutes.

L. D. DE FEITER,
Secretary I.U.W.D.S.
Steering Committee.

I.U.W.D.S.

FINANCIAL STATEMENT

1963

		Belgian Frs.
Balance left on January 1st 1963		222.916 90
EXPENSES :		
Travels and subsistence	13.124	
Secretarial expenses	9.905	
Stationary and reprints	854	
Postage, telephone	775 75	
Publications (codes and calendars)	74.657 45	
Total expenses		99.316 20
Balance in hands 31-12-1963		123.600 70
or $ 2472		

Brussels, January 25th 1964.

I.U.W.D.S.

Report on Activities as of 1963

1. — General information on the aims and structure of I.U.W.D.S. has been published in the Report on Activities as of 1962, cf. *U.R.S.I. Information Bulletin* No. 138, 1963 and *I.U.G.G.-Chronicle*, Nr. 50, 1963. The relation with S.C.A.R., W.M.O. and C.O.S.P.A.R. has been strengthened through the appointment of *a*) Dr. F. Jacka, chairman of the S.C.A.R. Working Group on Upper Atmosphere, to serve as informal liaison with the I.U.W.D.S. ; (*b*) Dr. Cressman, Washington, as liaison between the I.U.W.D.S. and W.M.O. for problems related to the International Geophysical Calendars ; (*c*) Mr. Ashford, W.M.O. Geneva, to serve as liaison between the I.U.W.D.S. and W.M.O. for other aspects of the cooperation ; (*d*) the Secretary of the I.U.W.D.S. as a representative to C.O.S.P.A.R. Working Group II.

2. — The preparations for the I.U.W.D.S. activities during the Year of the Quiet Sun have resulted in the publication of the World Days Manual, published by the I.Q.S.Y. Bureau in London and small format code booklets, published by the I.U.W.D.S. Secretariat and distributed free of charge to the participating observatories. This latter publication has been made possible through a grant of the Federation of Astronomical and Geophysical Services to which the I.U.W.D.S. adheres. The three I.U.W.D.S. officers attended the second general assembly of I.Q.S.Y. Rome, March, 1963, in order to norm the needs and desires pertaining to our service of the different working groups for I.Q.S.Y. As special undertakings by the I.U.W.D.S. service during I.Q.S.Y., we mention here :

(*a*) the trial forecasts of solar activity by Mrs. Dodson-Prince, Giovanelli and Michard, which are published weekly by the World Warning Agency ;

(*b*) the distribution of warning messages for solar flares, based upon the radio observations at 10 cm by the regional warning centers. A special demand for this type of warning message was expressed during the Rome meeting by the Cosmic Ray Working Group. Details of this plan will be published in *I.Q.S.Y. Notes*, No. 6.

3. — The I.U.W.D.S. Steering Committee held its second meeting during the General Assembly of U.R.S.I., Tokyo, September 1963. The minutes of this meeting are published in *U.R.S.I. Information Bulletin* and *I.U.G.G. Chronicle*. During this meeting it has been decided to accept Prague, Irkutsk and New Delhi as new associate regional warning centers within the scheme of I.U.W.D.S.

4. — The calendar records for the I.G.C. have been published in the *Annals of the I.G.Y.*, Volume **16**, part 3. It has been decided, by the I.U.W.D.S. Steering Committee to publish the calendar records from 1960 onwards in a separate series of the U.R.S.I. Monographs. In addition the calendar records for I.Q.S.Y. will be published quarterly in the *I.Q.S.Y. Notes*.

5. — For further details about the Ursigram Service, and the availability of ursigrams and alerts, the reader is referred to the Activities Report 1962.

L. D. DE FEITER,

Secretary I.U.W.D.S.
Steering Committee.

I.U.W.D.S.

BUDGETARY ESTIMATES

1964

1. Calendars	$ 250
2. Calendar records (1960, 1961 and 1962)	$ 3000
3. Supplements to Code Manual	$ 500
4. Secretarial expenses	$ 500
5. Traveling expenses	$ 500
Total	$ 4750
Balance per 31/12/1963	$ 2472
Sum, necessary in 1964	$ 2278

Note 1 : A first allocation of $ 1000 will be received from F.A.G.S. during March 1964.

Note 2 : The traveling expenses include traveling necessary for the collaboration with the principal organizations who provide or use the data, which from the object of the activities of I.U.W.D.S. (See also remark in point 9 of the Tokyo minutes).

Note 3 : About the same expenses are envisaged for 1965 with the exception that for the printing and publishing of the calendar records only $ 2000 will be needed, because only the years 1963 and 1964 have to be published.

COMMISSIONS INTER-UNIONS

I.U.C.A.F.

LES BESOINS DE L'OCÉANOGRAPHIE EN MATIÈRE DE RADIOCOMMUNICATIONS

Nous attirons l'attention des membres de l'I.U.C.A.F. et de tous ceux qui s'intéressent aux activités de ce Comité sur le rapport de la réunion mixte d'experts (Paris, 2-6 septembre, 1963) publié dans le *Journal des Télécommunications*, Vol. 31, nº 2, février 1964, p. 51.

OCEANOGRAPHY'S RADIO REQUIREMENTS

We are calling the attention of I.U.C.A.F. members and of those interested in the activities of that Committee to the report of the joint meeting of experts (Paris, 2-6 September, 1963) published in the *Telecommunication Journal*, Vol. 31, Nº. 2, February 1964, p. 51.

I. C. S. U.

Scientific and Special Committees

(Abstracts of the list of Officers)

SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH (S.C.A.R.) :

President : Dr. L. M. GOULD, Carleton College, Northfield, Minnesota, U. S. A.

Vice-President : Adm. R. Panzarini, Instituto Antarctico Argentino, Cerrito 1248. Buenos Aires, Argentina.

Secretary : Dr. G. de Q. ROBIN, Scott Polar Research Institute, Lensfield Road, Cambridge, United Kingdom.

COMMITTEE ON SPACE RESEARCH (C.O.S.P.A.R.) :

President : Prof. M. ROY, 55, boulevard Malesherbes, Paris 8e, France.

Vice-Presidents : Prof. A. BLAGONRAVOV, Academy of Sciences of the U. S. S. R., Leninskij Prospekt 14, Moscow, U. S. S. R.

Dr. R. PORTER, Engineering Service, 30th Floor, General Electric Company, 570 Lexington Avenue, New York 22, N. Y., U. S. A.

Executive Secretary : Mr. P. J. Beaulieu, 55, boulevard Malesherbes, Paris 8e, France.

SPECIAL COMMITTEE FOR THE INTERNATIONAL YEARS OF THE QUIET SUN (S.C.I.Q.S.Y.).

President : Prof. W. J. G. BEYNON, Department of Physics, University College of Wales, Aberystwyth, Cards, United Kingdom.

Vice-Presidents : Dr. M. POMERANTZ, Bartol Research Foundation, Swarthmore, Pennsylvania, U. S. A.

Dr. N. V. PUSHKOV, Director, Institute of Terrestrial Magnetism, Moscow U. S. S. R.

Prof. G. RIGHINI Osservatorio Astrofisico di Arcetri, Via San Leonardo 75, Firenze, Italy.

SECRETARY : Dr. C. M. MINNIS, I.Q.S.Y. Secretariat, 6 Cornwall Terrace, London N. W. 1, England.

Inter-Union Commissions

(Abstracts of the list of Officers)

COMITÉ INTERNATIONAL DE GÉOPHYSIQUE (C.I.G.) :

President : Prof. W. J. G. BEYNON, Department of Physics, University College of Wales, Aberystwyth, Cards, United Kingdom.

Vice-Presidents : Prof. V. V. BELOUSOV, Soviet Geophysical Committee, Molodezhnaya 3, Moscow, U. S. S. R.

Dr. M. POMERANTZ, Bartol Research Foundation, Swarthmore, Pennsylvania, U.S.A.

Prof. G. RIGHINI, Osservatorio Astrofisico di Arcetri, Via San Leonardo 75, Firenze, Italy.

Secretary General : Ing. Gen. G. R. LACLAVÈRE, 140, rue de Grenelle, Paris 7e, France.

INTER-UNION COMMISSION FOR FREQUENCY ALLOCATIONS FOR RADIO ASTRONOMY AND SPACE SCIENCE (I.U.C.A.F.) :

Chairman : Dr. J. F. DENISSE, Observatoire de Paris, rue de l'Observatoire, Paris 14e, France.

Secretary General : Dr. R. L. SMITH-ROSE, 21 Tumblewood Road, Banstead, Surrey, United Kingdom.

INTER-UNION COMMISSION ON THE IONOSPHERE (I.U.C.I.) :

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

Vice-Chairman : Dr. H. FRIEDMAN, U. S. Naval Research Laboratory, Code 7100, Washington 25, D. C. U. S. A.

Secretary : Prof. C. V. ALLEN, University of London, Observatory, Mill Hill Park, London N. W. 7, United Kingdom.

INTER-UNION COMMISSION ON RADIO METEOROLOGY (I.U.C.R.M.) :

Chairman : Prof. J. S. MARSHALL, Department of Meteorology, McGill University, Montreal 2, Quebec, Canada.

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

INTER-UNION COMMISSION FOR SOLAR AND TERRESTRIAL RELATIONSHIPS (I.U.C.S.T.R.) :

President : Prof. C. W. ALLEN, University of London Observatory, Mill Hill Park, London N. W. 7, United Kingdom.

Secretary : Prof. D. K. BAILEY, U. S. A.

INTER-UNION COMMISSION ON ATMOSPHERIC SCIENCES (I.U.C.A.S.)

President : to be named.

Secretary : Prof. G. D. GARLAND, Geophysics Laboratory, University of Toronto, Toronto 5, Ontario, Canada.

C. O. S. P. A. R.

Sixth Meeting, Warsaw (Poland)

June 2-12, 1963

The report of this meeting has been issued.

We quote the following from this report :

Report on behalf of the International Scientific Radio Union, presented by Prof. S. SILVER.

From the very first inception of the use of rockets for investigations of the upper atmosphere and solar activity the International Scientific Radio Union has taken a strong interest in space research and the related technologies of electronics and communications. Each of the seven commissions of the U.R.S.I. has responded to the challenges and problems presented to it in its particular field by space research and has been developing new programs and study groups to deal with those problems. The U.R.S.I. has found C.O.S.P.A.R. an effective means of relating its interests to those of the other Unions and in developing programs of common interest.

The U.R.S.I. formed two *ad hoc* committees on space radio research and space radio relays at its 1957 General Assembly and on the basis of the studies of those committees set up its Committee on Space Radio Research at the General Assembly held in London in 1960. This Committee provides a coordinating function for the interests of the seven commissions and for coordination of U.R.S.I. with C.O.S.P.A.R. and other bodies. The Committee set plans for two symposia in the period 1960-1963. One, a symposium on Space Communications, was held in Paris in the spring of 1962 and its proceedings have appeared as a monograph with the corresponding title. The second was intended to deal with techniques of space research, particularly with regard to the integra-

tion of data acquisition considerations with the design of experiments. The symposium was held in abeyance and instead a special plenary session of the coming General Assembly to be held in Tokyo in September 1963 is to be devoted to an examination of general areas of space science. The topics to be covered are :

(*a*) Ionospheric research by means of satellites and space probes ;

(*b*) Planetary research in the millimeter, infra-red and optical regions ;

(*c*) Space communications — the present status and future problem areas ;

(*d*) Data acquisition and reduction and the design of experiments.

Space radio research will constitute a dominant theme of the 1963 General Assembly for in addition to the general program of the plenary session just mentioned each commission is holding a technical session directed to the specialized problems of space research or results already obtained with space vehicles in the areas of measurements, tropospheric radio, ionospheric radio, the magnetosphere, communications, and electronics.

The U.R.S.I. holds a special position relative to the C.C.I.R. and provides the scientific background for the study groups devoted to questions of space communications as well as other matters of radio communications. It is, accordingly, heavily involved and interested in matters of frequency allocations and in concert with the I.A.U. and C.O.S.P.A.R. is taking a part in the program of getting protection for frequency bands of vital importance to radio astronomy and space research. The Union suffered a great loss in the death of Dr. Dellinger who led its activities in the C.C.I.R. The matter of marshalling the forces of the Union and its representation in this important work will be a consideration of first priority at the General Assembly in September, 1963.

Report of the Inter-Union Committee on Frequency Allocations for Radio Astronomy and Space Science (*I.U.C.A.F.*), presented by Professor H. C. van de HULST.

It is about 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 part of the spectrum.

More recently, the development of artificial earth satellites and deep space probes for studying the upper regions of the atmosphere and of cosmic space has depended upon radio techniques for locating the satellites and for receiving the information provided by the measuring instruments in these space stations.

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

The International Telecommunications Union (I.T.U.), a specialized agency of the United Nations Organization, is the world organization exercizing authority to establish regulations for the use of the radio spectrum. It is assisted by the International Radio Consultative Committee (C.C.I.R.). The case for science is being presented to these bodies by a committee under I.C.S.U., which bears the name Inter-Union Committee on Frequency Allocations for Radio Astronomy and Space Science (I.U.C.A.F.). This committee was established in 1960 to co-ordinate the future requirements of frequency channels for radio-astronomy and space science. It consists of three representatives of each of the constituent bodies : the International Scientific Radio Union (U.R.S.I.), the International Astronomical Union (I.A.U.), and the International Committee on Space Research (C.O.S.P.A.R.) 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 has 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.

« Radio astronomy » was recognised as a service by the 1959 Administrative Radio Conference of I.T.U. A new definition of « Space research service » as « a space service in which spacecraft are used for research purposes » has been adopted by the Tenth Plenary Assembly of the C.C.I.R. last February, in addition to but distinct from, definitions of Communication-satellite service, Meteorological-satellite service, Radionavigation-satellite service and Broadcasting-satellite service. This is in direct response to the resolutions passed by C.O.S.P.A.R. at Washington last year, which were supported by I.U.C.A.F., and at least partially fulfils the desires put forth by C.O.S.P.A.R. Many further definitions relating to the space services have been adopted for use by C.C.I.R. It is likely that these definitions will be taken over by the I.T.U. This is gratifying progress but the problem of actual allocations of frequency bands to these services has still to be settled. In fact, the radio astronomy requests, about which I shall not report in detail, so far have received somewhat more positive support from the national administrations and regional organizations than the claims of frequencies for space research.

A very important Extraordinary Administrative Radio Conference (E.A.R.C.) of the I.T.U. will start on 7 October 1963 in Geneva. On the agenda of this conference is :

(*a*) to decide on the allocation of frequency bands essential for the various categories of space radiocommunications and for radio astronomy ;

(*b*) to consider whether there is a continuing need for the allocation of each of the bands designated for space research and take appropriate action in this regard ;

as well as any other action appropriate to these purposes.

Among the papers which will be before this conference are two documents prepared by the C.C.I.R. plenary assembly, namely :

1. *A recommendation* referring to « Telecommunication links for deep space research ; frequencies, bandwidths and interference criteria », and

2. *A report* on « Technical characteristics of telecommunication links between earth stations and spacecraft for research » (Answer to question 211 of Commission IV).

May I suggest that the appropriate Working Group of C.O.S.P.A.R. examine these documents as well as the present status of frequency allocations for the Space research service (reproduced in appendix IV to document I.U.C.A.F./31)and re-examine its own resolution of last year to see what further action of C.O.S.P.A.R. is required at this stage. Any recommendations or suggestions resulting from this work should be brought to the attention of the secretary of I.U.C.A.F. in order that they may still be forwarded to I.T.U. in time for consideration at the coming conference.

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 satellites and space probes 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.

Report of International Ursigram and World Days Service (*I.U.W.D.S.*), presented by Mr. A. H. SHAPLEY, Chairman of the I.U.W.D.S. Steering Committee :

The International Ursigram and World Day Service (I.U.W.D.S.) is another I.C.S.U. inter-union activity, a permanent service of

U.R.S.I. in association with I.A.U. and I.U.G.G. It is primarily concerned with the coordination in time of solar-geophysical science. It issues the annual International Geophysical Calendar long in advance, issues Solar and Geophysical Alerts on a day-to-day schedule, and provides for rapid collection and distribution, mostly by telegram, of summary data on outstanding solar and geophysical events.

There are two main points of contact between I.U.W.D.S. and C.O.S.P.A.R.

(1) I.U.W.D.S. provides and manages for C.O.S.P.A.R. an international telegraphic channel for rapid distribution of satellite and space probe information of general interest to the scientific community. In particular this covers launching announcements and orbital data. These communication arrangements are called the SPACEWARN system. It is also used to a limited extent for tracking station predictions and reports of tracking observations. The organization of this work is handled in Dr. Mitra's Working Group 3, but the SPACEWARN system is intended to serve all of C.O.S.P.A.R.

(2) The regular services of the I.U.W.D.S. — the Calendar, the Alerts, the rapid exchange of solar-geophysical data — are intended to serve the scientists working through C.O.S.P.A.R. as much as those associated directly with I.A.U., U.R.S.I. and I.U.G.G. To improve the liaison in this area, it is gratifying that C.O.S.P.A.R. has appointed the I.U.W.D.S. Secretary as a correspondent to Working Group 2.

Reports of C. O. S. P. A. R. Working Group

WORKING GROUP 1 ON TRACKING AND TELEMETRY

Frequencies for Space Research.

A working paper from the C.O.S.P.A.R. representative to I.U.C.A.F. (p. 81) concerning frequency allocations for space research was considered with the following conclusions :

(i) Since the recovery of data from space vehicles is essential to their use in space research it was agreed that C.O.S.P.A.R. should make a recommendation that efforts should be made to guarantee continued allocations of suitable frequency bands. (Resolution 8.)

(ii) Noting the importance of the band 8400-8500 Mc/s for space and earth space services, it was urged that the C.O.S.P.A.R. representative to I.U.C.A.F. should press for the exclusive allocation of this band in preference to the present secondary allocation.

(iii) In connection with the estimates of total band-widths required for space research in the various frequency regions, it was suggested that the attention of I.U.C.A.F. should be drawn to Resolution 11 of the Washington Meeting.

(iv) In order to assist non-professional delegates to the Extraordinary Administrative Radio Conference (E.A.R.C.) in acquiring a proper appreciation of space research (as distinct from space communication) requirements, it is suggested that an article be prepared by C.O.S.P.A.R. for publication in the *I.T.U. Journal.*

It was also agreed that support for the claims for the frequency band 137-138 Mc/s in addition to the present 136-137 Mc/s band should be provided by the countries requiring its use rather than by C.O.S.P.A.R. It was suggested that U.S.A. and U.S.S.R. should present their cases directly to the Secretary of I.U.C.A.F.

RES. 8. — *Allocation of frequencies for transmission of data.*

Considering that the transmission of data from space vehicles to the ground is essential to the use of such vehicles in space research, C.O.S.P.A.R. *recommends* that through I.U.C.A.F., every effort should be made to guarantee the continued allocation of suitable frequency bands for this purpose.

I. U. G. G.

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The I.U.G.G. Executive Committee is composed of the following persons (Statutes ; Art. 10) :

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International Association of Geodesy : M. J. J. Levallois , 19, rue Auber, Paris 9e, France.

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International Association of Volcanology : Prof. F. Penta, Istituto di Geologia Applicata, Faculta d'Ingegneria, Via Eudossiana 18, Rome, Italy.

U.R.S.I. Golden Jubilee Memorial : 50 Years of Radio Science

We have the pleasure to quote from the *I.U.G.G. Chronicle* (No. 51, December 1963) the following :

On the occasion of the fiftieth anniversary of the founding of the Union Radio Scientifique Internationale in Brussels on 13 October 1913, the I.U.G.G. wishes to congratulate its sister Union on the important role it plays in international scientific affairs and sends best wishes for future successful endeavours.

U.R.S.I. is also to be congratulated on the publication of this excellent account of its history and its current activities. The volume was suggested by Dr. L. V.Berkner, U. R. S. I. President 1957-1960 and executed during the presidency of Dr. R. L. Smith-Rose. Tribute is paid to Col. Ing. Herbays, Secretary General of U.R.S.I. for his advice and encouragement in ensuring prompt publication and we take this opportunity of thanking him for the close co-operation that he has maintained between our two organizations.

The preface by Sir Edward Appleton is followed by a History of U.R.S.I. by the late Dr. J. H. Dellinger. The suceeding seven

chapters review the history of each of the seven commissions and are :

Chapter I. — Radio Measurements and Standards, L. Essen.

Chapter II. — Tropospheric Radio, J. A. Saxton.

Chapter III. — Ionospheric Radio, J. A. Ratcliffe.

Chapter IV. — Radio Noise, F. Horner.

Chapter V. — Radio Astronomie, R. Coutrez et R. Gonze.

Chapter VI. — Radio Waves and Circuits, S. Silver.

Chapter VII. — Radio Electronics, G. A. Woonton.

The remaining three chapters deal with international activities in which U.R.S.I. has played a leading part. They are :

Chapter VIII. — U.R.S.I. and the International Years, W. J. G. Beynon.

Chapter IX. — Permanent Service, E. Herbays.

Chapter X. — U.R.S.I. and Space Research, H. S. W. Massey.

The three appendices present a factual record of : (i) the dates and places of the General Assemblies, and of the Officers associated therewith, (ii) the Officers of all the Commissions and Committees associated with U.R.S.I. ; and (iii) a list of the publications of U.R.S.I.

The book, bound in green cloth, is excellently produced and in addition to being of a commemorative nature forms an excellent work of reference.

UNESCO

Calendrier des Conférences et Réunions pour 1964 (Extraits)

Calendar of Conferences and Meetings for 1964 (Abstracts)

— Ne figurent pas dans ce calendrier les réunions convoquées par l'Organisation des Nations Unies, par une autre Institution spécialisée ou par une organisation internationale, auxquelles l'U.N.E.S.C.O. a été invitée à envoyer des représentants ou des observateurs ; n'y figurent pas non plus les réunions tenues dans le cadre de leurs activités normales par des organisations internationales non gouvernementales qui reçoivent une subvention de l'U.N.E.S.C.O.

— The calendar does not include meetings called by U.N., other Specialized Agencies or other international organizations to which U.N.E.S.C.O. has been invited to send representatives or observers ; nor does it include meetings called as part of their regular activities by international non-governmental organizations which receive subventions from U.N.E.S.C.O.

Dates 1964	Lieu/Place	Titre/Title	Département et fonctionnaire responsables/Department and official responsible
Jan. 21-23	UNESCO	Groupe de travail sur les météorites. Working Group on Meteorites.	NS (**7**) (M. FOURNIER D'ALBE)
Jan. 27-Feb. 1	Rome (Italie)	Groupe de travail sur la « Traduction et la terminologie scientifiques ». Working Party on « Scientific Translation and terminology ».	NS (M. PÉREZ-VITORIA)
Fév./Feb.	UNESCO	Comité consultatif international de bibliographie, de documentation et de terminologie : groupe de travail sur la documentation dans les sciences exactes et naturelles. International Advisory Committee on Bibliography, Documentation and Terminology : working party on documentation in the Natural Sciences.	NS (M. PÉREZ-VITORIA)
Fév./Feb.	UNESCO	Groupe de travail technique sur la documentation scientifique. Technical working party on scientific documentation.	NS (M. PÉREZ-VITORIA)
Oct.	(Europe)	Stage d'études sur le repérage optique des satellites artificiels (conjointement avec COSPAR). Training course on techniques for the optical tracking of artificial satellites (jointly with COSPAR).	NS (M. FOURNIER D'ALBE)

Dates 1964	Lieu/Place	Titre/Title	Département et fonctionnaire responsables/Department and official responsible
?	?	Stage d'études international UNESCO/IQSY sur la géophysique (conjointement avec le comité CIG/IQSY). UNESCO/IQSY international training course in geophysics (jointly with CIG/IQSY Committee).	NS (M. FOURNIER D'ALBE)
?	?	Groupe de travail de la Commission Océanographique Internationale sur les télécommunications. Working Group on communications of the International Oceanographic Commission.	NS (M. TAKENOUTI)
Mai/May 12-16	Florence (Italy)	Cinquième Colloque international sur la recherche spatiale (contrat avec COSPAR). Fifth international space science symposium (contract : COSPAR).	NS (M. FOURNIER D'ALBE)
Juil./July 20-24	UNESCO	Conférence internationale sur la physique des semi-conducteurs (contrat avec l'UIPPA et la Société française de physique). International Conference on the Physics of Semi-Conductors (contrat : IUPAP and Société française de physique).	NS (M. PÉREZ-VITORIA)

([1]) NS = Département des Sciences Exactes et Naturelles/Natural Sciences Department.

ACADEMIE INTERNATIONALE D'ASTRONAUTIQUE

Réunions scientifiques de l'Académie Internationale d'Astronautique

Le Président de l'Académie Internationale d'Astronautique, le Dr C. S. Draper, de passage à Paris pour la réunion du Conseil d'Administration de l'Académie, a donné quelques informations sur les réunions envisagées pour cette année et l'année prochaine, pour lesquelles deux Comités d'organisation ont été constitués.

L'un de ces Comité prépare un second symposium international sur les « problèmes fondamentaux concernant les facteurs d'ambiance rencontrés par l'Homme dans l'Espace », qui est prévu pour le mois de juin 1965.

Un autre Comité est chargé de l'organisation d'un symposium d'une journée sur les problèmes relatifs aux « Véhicules spatiaux en milieu ionisé », qui aura lieu au cours du XV^e^ Congrès international d'Astronautique à Varsovie (du 7 au 12 septembre 1964). Le Comité est constitué comme suit :

Président : Dr. S. F. SINGER, U. S. Weather Bureau, Washington, D. C. (U. S. A.).

Membres : Dr. R. R. ALLAN, Royal Aircraft Establishment, Farnborough (G. B.).

Prof. M. LUNC, Université de Varsovie, Varsovie (Pologne).

Prof. L. NAPOLITANO, Université de Naples (Italie).

Prof. M. NICOLET, Centre National de Recherches de l'Espace, Bruxelles (Belgique).

Prof. L. I. SEDOV, Académie des Sciences, Moscou (U. R. S.S.)

Les sujets suivants sont prévus au programme préliminaire :

— le plasma périphérique de l'atmosphère de la Terre.

— les effets électro-statiques sur les corps évoluant dans la magnétosphère terrestre et dans l'espace interplanétaire.

— dynamiques de l'interaction d'un corps électriquement chargé et un plasma en présence ou en l'absence d'un champs magnétique ;

— traînée électrique (Coulomb) ; technologie de l'espace et applications d'astrophysique ;

— phénomènes électromagnétiques dans le sillage de corps évoluant dans un plasma ; effets MHD ; rayonnement provenant des sillages ;

— effets de propagation des ondes radio ; observations et théorie.

Ces deux symposiums sont organisés conjointement par l'Académie de la Fédération Internationale d'Astronautique avec l'aide et la coopération de l'U.N.E.S.C.O.

Il est également prévu au Congrès de Varsovie une séance consacrée à la discussion d'un programme de recherches éventuelles qui pourraient être entreprises par un laboratoire international lunaire habité. C'est le Dr. F. J. Malina, ancien Président de l'Académie et président de son Comité du Laboratoire international lunaire, qui est chargé d'organiser cette réunion.

Des renseignements complémentaires pourront être obtenus ultérieurement auprès du Secrétariat de l'Académie et de la Fédération Internationale d'Astronautique, au 250 de la rue Saint-Jacques, Paris 5e, France. Tous renseignements concernant les inscriptions au Congrès de Varsovie et les hôtels seront fournis par la Société polonaise d'astronautique à l'adresse suivante : ASTRONAUT P. K. i. N., p. 23-18, Varsovie, Pologne.

Nouveaux Membres élus à l'Académie Internationale d'Astronautique

Le Professeur C. Stark Draper, Président de l'Académie Internationale d'Astronautique, vient d'annoncer l'élection à l'Académie des membres correspondants suivants dans la *Section des*

Sciences fondamentales :

Dr. LLOYD V. BERKNER, Graduate Research Center of the Southwest, Dallas, Texas (U. S. A.).

Prof. J. COULOMB, Centre National d'Etudes Spatiales, Paris (France).

Dr. H. ELLIOT, Ecole de Physique, Imperial College, Londres (G. B.).

Dr. George GAMOW, Ecole de Physique et d'Astrophysique, Université de Colorado Boulder, Col. (U. S. A.).

Prof. Samuel HEERICK, Université de Californie à Los Angeles, Cal. (U. S. A.).

Dr. Chia-Chiao LIN, Massachusetts, Institute of Technology, Cambridge, Mass. (U. S. A.).

Dr. A. P. MITRA, Laboratoire National de Physique, Nouvelle-Delhi (Inde).

Prof. Tatsuzo OBAYASHI, Laboratoire de Recherches ionosphériques, Université de Kyoto, Kyoto (Japan).

Prof. Yngve OHMAN, Observatoire de Stockholm, Saltsjöbaden (Suède).

Dr. P. SWINGS, Institut d'Astrophysique, Cointe-Sclessin (Belgique).

Dr. John W. TOWNSEND, Jr., N.A.S.A. Goddard Space Flight Center, Greenbelt, Md. (U. S. A.).

Prof. C. E. von WEIZSÄCKER, Université d'Hambourg (République Fédérale Allemande).

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Commission Electrotechnique Internationale

Publication 74 : *Deuxième édition.* — Méthode pour évaluer la stabilité à l'oxydation des huiles isolantes.

Publication 117-4 : *Première édition.* — Symboles graphiques recommandés 4e partie : Appareils de mesure et horloges électriques.

Publication 117-5 : *Première édition.* — Symboles graphiques recommandés, 5e partie : Usines génératrices, sous-stations et postes, lignes de transport et de distribution.

Publication 146 : *Première édition.* — Cellules, éléments, assemblages, et groupes redresseurs semiconducteurs monocristallins.

Modification n° 1 à la Publication 71 : *Troisième édition* 1960. — Directives pour la coordination de l'isolement.

Publication 138*A* : *Première édition.* — Complément à la Publication 138 (1962). Méthodes pour les mesures des propriétés électriques essentielles des antennes de réception dans la gamme de fréquence de 30 MHz à 1000 MHz.

Publication 150 : *Première édition.* — Essai et étalonnage de générateurs d'ultrasons à usage thérapeutique.

Publication 151-1 : *Première édition.* — Mesures des caractéristiques électriques des tubes électroniques. 1re partie : Mesure de courant d'électrode.

Publication 151-2 : *Première édition.* — Mesures des caractéristiques électriques des tubes électroniques. 2e partie : Mesure du courant de chauffage.

Publication 151-3 : *Première édition.* — Mesures des caractéristiques électriques des tubes électroniques. 3e partie : Mesure des admittances équivalentes d'entrée et de sortie.

Publication 151-4 : *Première édition.* — Mesures des caractéristiques électriques des tubes électroniques. 4e partie : Méthodes de mesure du facteur de bruit.

Modification n° 1 à la Publication 115 : *Première edition* 1959. — Recommandations pour résistances fixes non-bobinées Type I.

Publication 63 : *Deuxième édition.* — Séries de valeurs normales pour résistances et condensateurs.

Modification n° 1 à la Publication 68-1 : *Deuxième édition* 1960. — Essais fondamentaux climatiques et de robustesse mécanique recommandés pour les pièces détachées pour matériel électronique. 1re partie : Généralités.

Ces publications sont en vente au Bureau Central de la C.E.I., aux prix suivants :

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International Electrotechnical Commission

Publication 74 : *Second edition.* — Method for assessing the oxidation stability of insulating oils.

Publication 117-4 : *First edition.* — Recommended graphical symbols. Part 4 : Measuring instruments and electric clocks.

Publication 117-5 : *First edition.* — Recommended graphical symbols. Part 5 : Generating stations and substations, lines for transmission and distribution.

Publication 146 : *First edition.* — Monocrystalline semiconductor rectifier cells, stacks, assemblies and equipments.

Amendment n° 1 *to Publication* 71 : *Third edition* 1960. — Recommendations for insulation co-ordination.

Publication 138*A* : *First edition.* — Supplement to Publication 138 (1962). Methods of measurement of essential electrical properties of receiving aerials in the frequency range from 30 Mc/s to 1000 Mc/s.

Publication 150 : *First edition* .—Testing and calibration of ultrasonic therapeutic equipment.

Publication 151-1 : *First edition.* — Measurements of the electrical properties of electronic tubes and valves. Part 1 : Measurement of electrode current

Publication 151-2 : *First edition.* — Measurements of the electrical properties of electronic tubes and valves. Part 2 : Measurement of heater or filament current.

Publication 151-3 : *First edition.* — Measurements of the electrical properties of electronic tubes and valves. Part 3 : Measurement of equivalent input and output admittances.

Publication 151-4 : *First edition.* — Measurements of the electrical properties of electronic tubes and valves. Part 4 : Methods of measuring noise factor.

Publication 63 : *Second edition.* — Preferred number series for resistors and capacitors.

Amendment n° 1 *to Publication* 115 : *First edition* 1959. — Recommendations for fixed non-wirewound resistors Type I.

Amendment nº 1 *to Publication* 68-1 : *Second edition* 1960. — Recommended basic climatic and mechanical robustness testing procedure for components for electronic equipment. Part 1 : General.

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151-4	4.50
Amend. to 115	1.50
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Amend. to 68-1	3.—

plus postage and packing.